THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. XCIV. No. 2244.] LONDON, MAY 15, 1906. [58TH YEAR. PRICE 6d.

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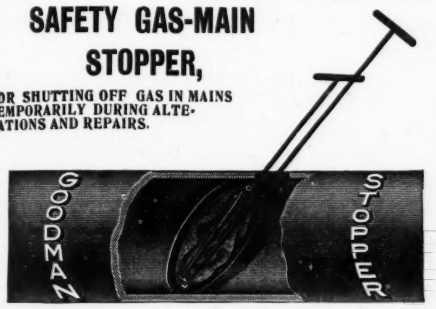
FOR SHUTTING OFF GAS IN MAINS TEMPORARILY DURING ALTERATIONS AND REPAIRS.



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HIGHLY SENSITIVE. LONG-RANGE.

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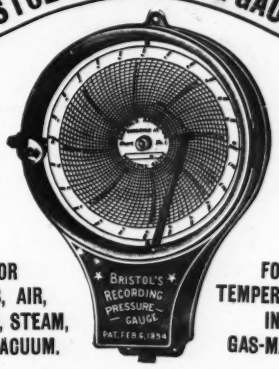

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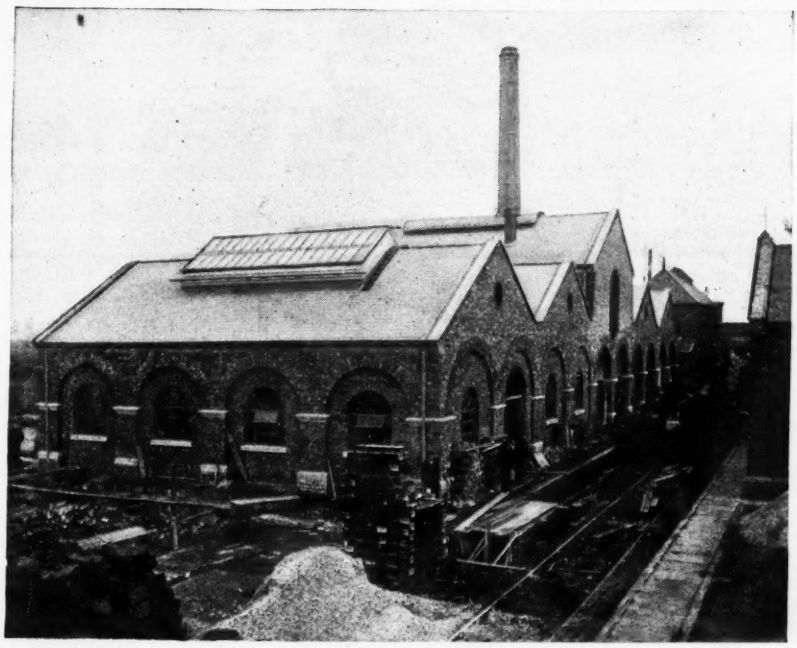

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NO OIL REQUIRED.

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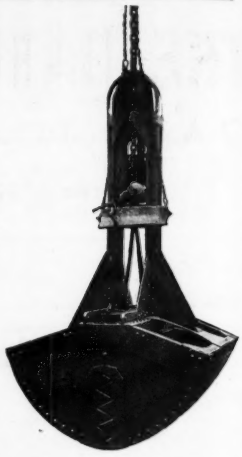

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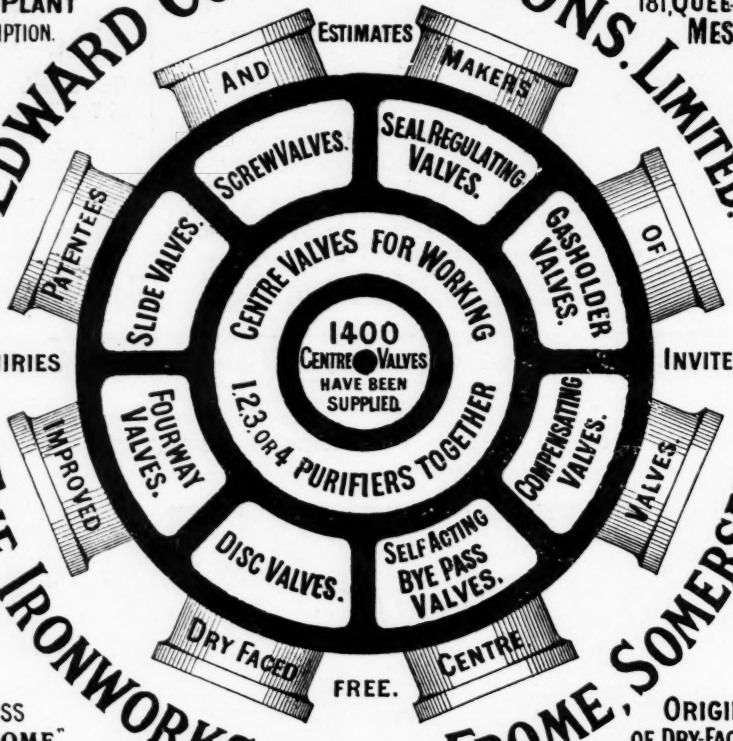

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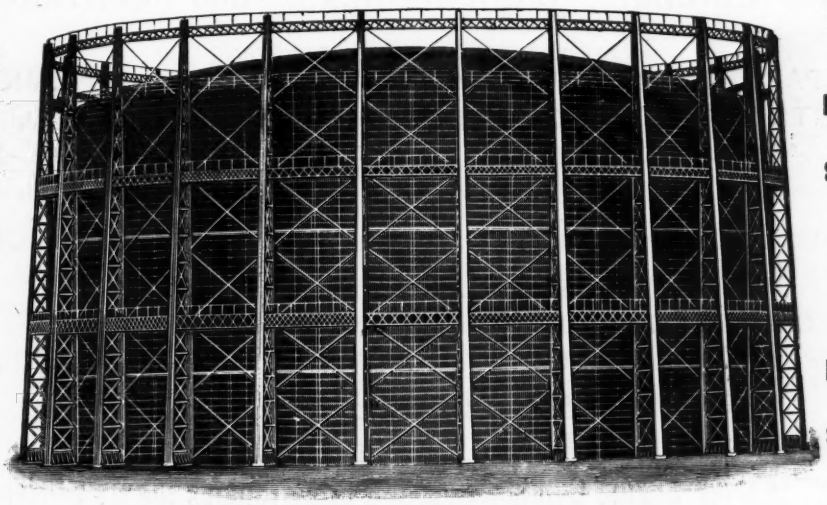

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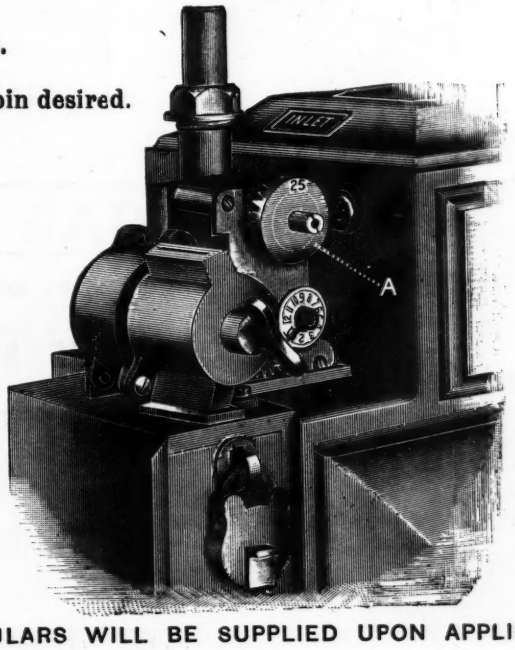

Change of Price effected by simply removing Crown Wheel "A" and replacing same with another Wheel.

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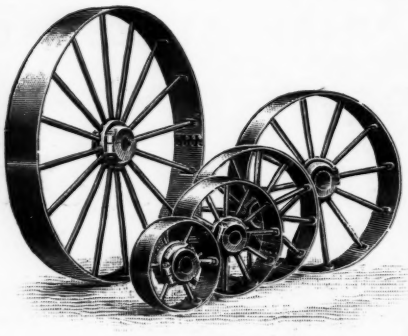

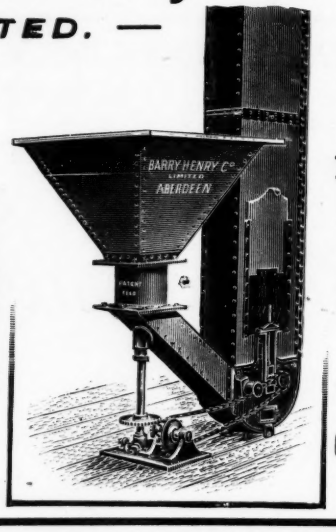

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(PATENTED)

Fig. 35. 100 c.p.

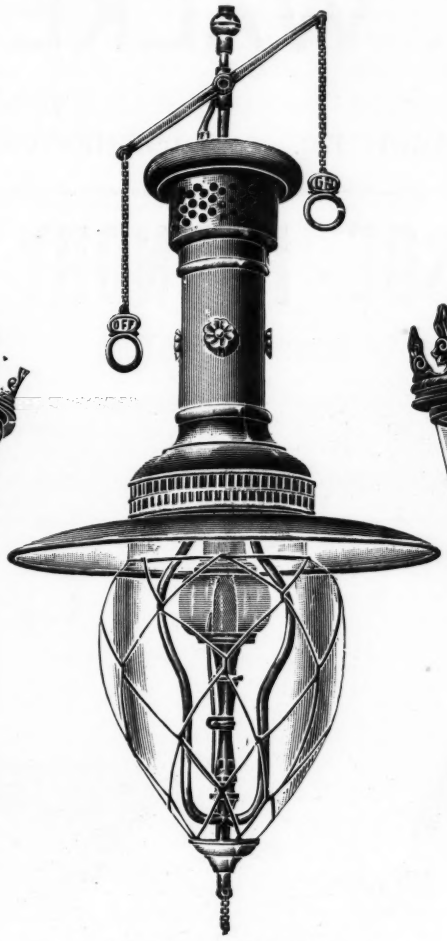

Fig. 607. 600 c.p.
Self-Intensifying.

Fig. 35a. 300 c.p.
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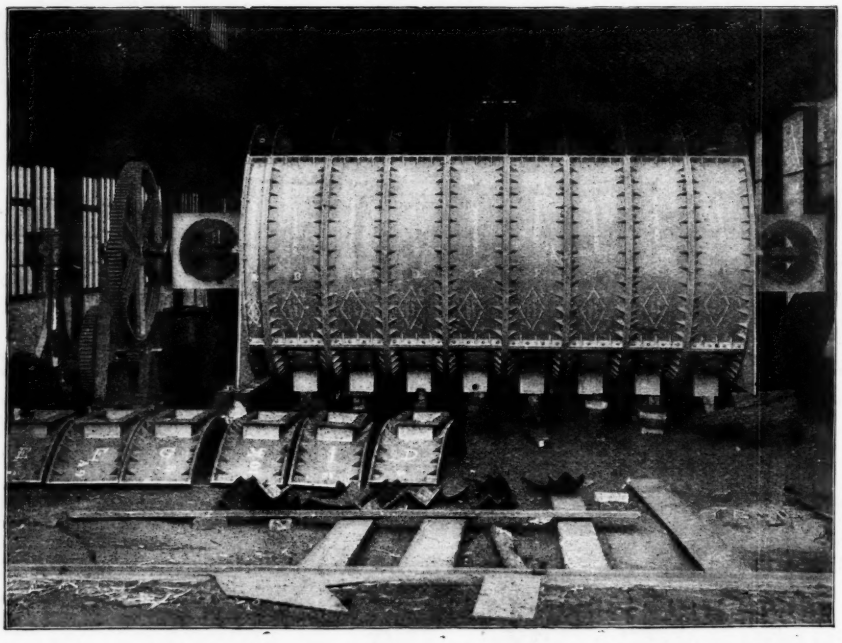
REMOVAL OF THE WHOLE OF THE AMMONIA AND A LARGE PERCENTAGE OF CO_2 AND SH_2.



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BUNDLES EASILY ACCESSIBLE FOR CLEANING.

"Whessoe" Rotary Washer-Scrubber (H. Kirkham & Chandler's patent). **Capacity 1,500,000 Cub. ft. per diem.**
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For TAR and all Thick Fluids.

FIRST AWARDS EVERYWHERE.

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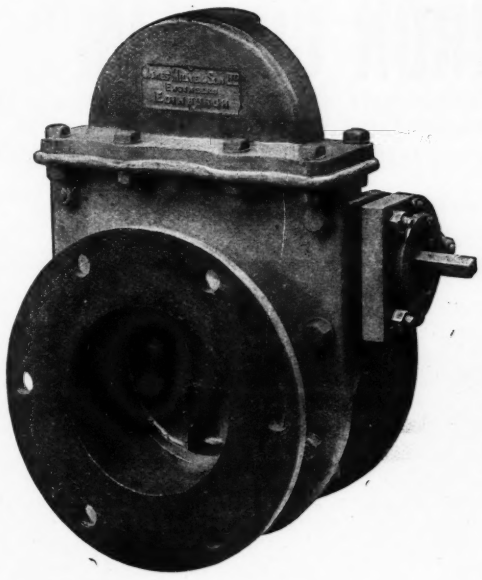
USUAL SIZES IN STOCK.

FACES MACHINED THROUGHOUT.



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TESTED AT

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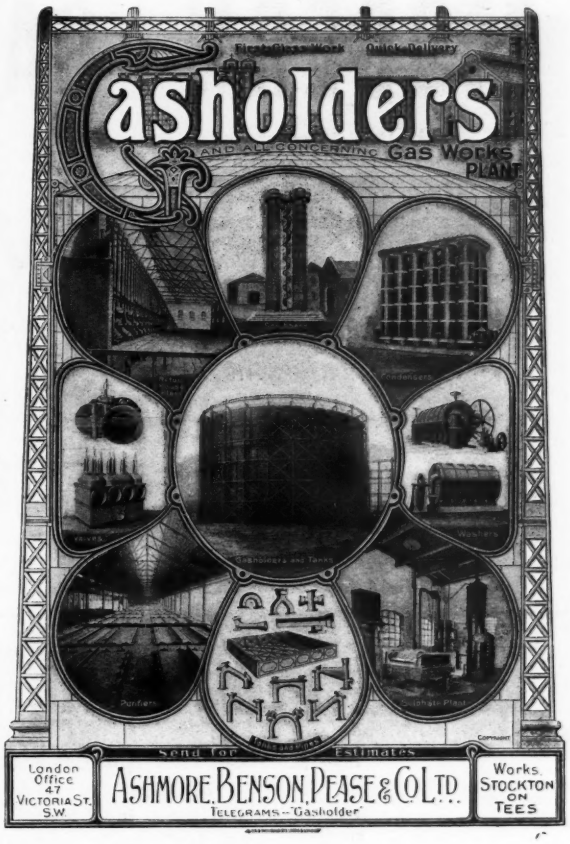

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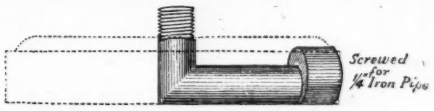
And THIN WOOD BLOCKS

FOR FIXING GAS-FITTINGS

SAVE TIME AND MONEY.



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PATENT TAR-EXTRACTOR

As a Naphthalene Remover.

The Exhaust Steam heats up the Tar and the Gas, and enables it to remove the maximum amount of Naphthalene. By removing the Tar, no Naphthalene is carried forward to the Scrubbers, except in strong and thorough combination with an **EXCESS** of light hydrocarbons, so evenly distributed and always sufficient in quantity to prevent the action of ammonia on the phenols liberating the Naphthalene dissolved by them.

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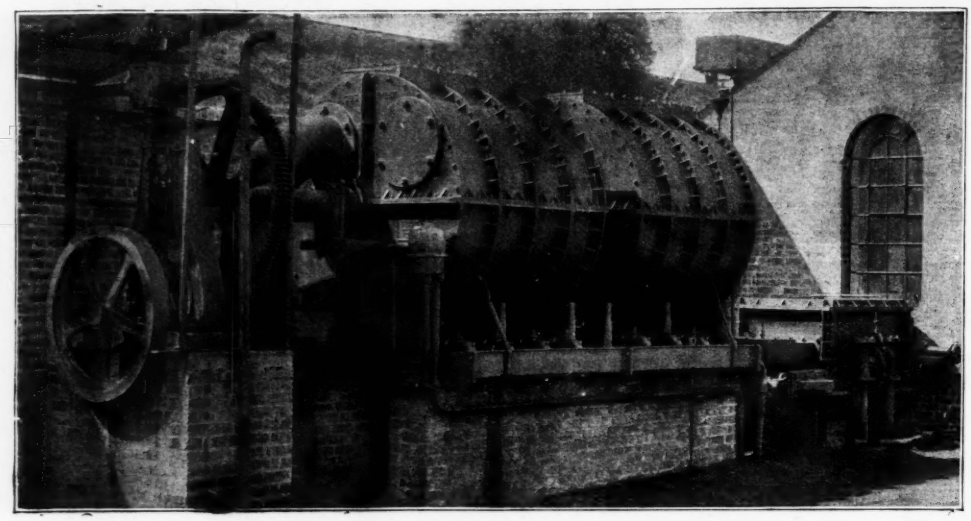

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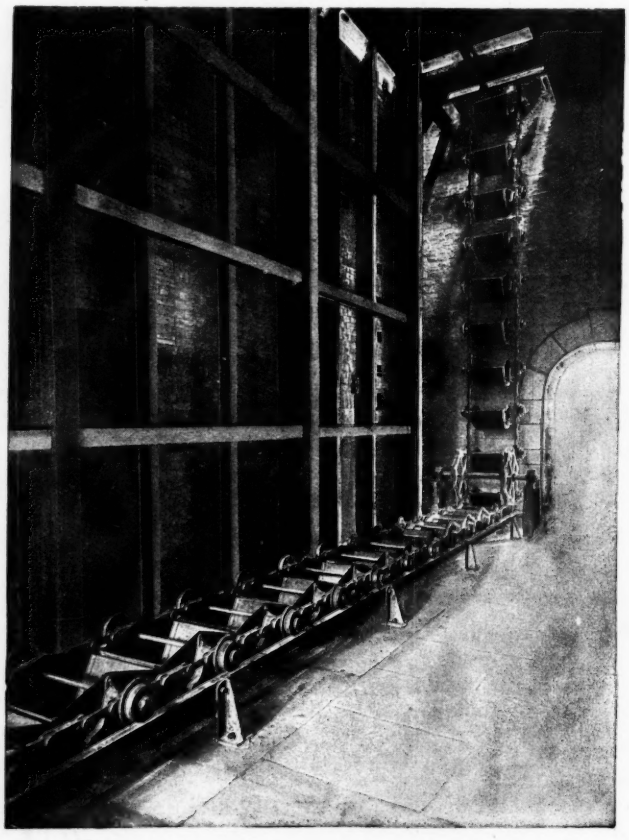
Inclined Retort Installation, WITH Gravity Bucket Conveying Plant.



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IF NOT, IT CAN ONLY BE BECAUSE YOU HAVE NOT TRIED IT.

IT HAS HELPED ALL WHO HAVE TRIED IT; AND THEY ARE MANY.

FOR INSTANCE:—

We have just fitted 200 Cooker Installations for the Padiham Gas Department, and have been instructed to fit up 500 more.

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Every house we fit up means more Gas sold by the Gas Authority.

Every time we fit up houses we get Repeat Orders.

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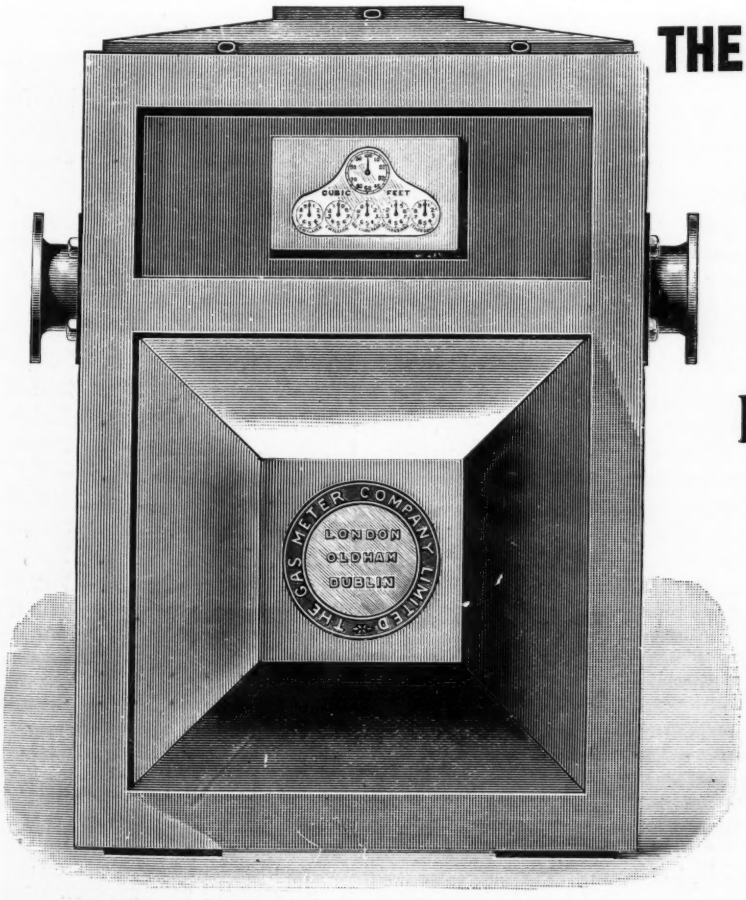

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ALL SIZES IN STOCK.

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— DOUBLE-SUPERHEATER SYSTEM. —

	Cubic Feet Daily.		Cubic Feet Daily.		Cubic Feet Daily.
Aarhus, Denmark	800,000	G. L. & C. Co., Beckton	2,250,000	Redhill	275,000
Antwerp, Belgium	1,500,000	G. L. & C. Co., „ (2nd)	10,750,000	Redhill (Second)	300,000
Aylesbury	150,000	G. L. & C. Co., Bromley	3,750,000	Reichenberg, Bohemia	200,000
Barrow	300,000	G. L. & C. Co., Fulham	1,750,000	Romford	300,000
Bath	1,000,000	G. L. & C. Co., Nine Elms	2,750,000	Rotterdam, Holland	850,000
Belfast	1,700,000	Geneva, Switz.	500,000	Rotterdam, Holland (Second)	1,500,000
Belfast (Second)	4,500,000	Gosport	200,000	Rotterdam, Holland (Third)	750,000
Birmingham	1,500,000	Göteborg, Sweden	300,000	St. Gallen, Switz.	225,000
Bordentown, N.J.	125,000	Guildford	350,000	St. Joseph, Mo.	750,000
Bournemouth	1,000,000	Hamburg, Germany	1,750,000	Santiago de Cuba	400,000
Bremen, Germany	550,000	Hartlepool	750,000	Scarborough	800,000
Bremen, Germany (Second)	950,000	Hebden Bridge	200,000	Shanghai	225,000
Brentford	1,200,000	Heidelberg, Germany	200,000	Shanghai (Second)	225,000
Bridlington	150,000	Holyoke, Mass.	600,000	Southampton	800,000
Bridlington (Second)	200,000	Hull	1,500,000	Southampton (Second)	500,000
Brighton	1,750,000	L. & N.W. Rly., Crewe	700,000	Southgate	400,000
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Brussels—Forest	1,000,000	Lea Bridge	350,000	Southport (Second)	900,000
Brussels—Ville	750,000	Lea Bridge (Second)	350,000	Stafford	500,000
Brussels—Ville (Second)	750,000	Liége, Belgium	1,000,000	Staines	600,000
Brussels—Ville (Third)	1,500,000	Lincoln	500,000	Stockport	600,000
Carlisle	600,000	Liverpool	3,500,000	Stockport (Second)	600,000
Chorley	300,000	Liverpool (Second)	4,500,000	Stockton-on-Tees	500,000
Commercial Gas Co.	850,000	Longton	600,000	Swansea	750,000
Commercial (Second)	850,000	Magdeburg, Germany	1,400,000	Swansea (Second)	1,000,000
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Copenhagen	700,000	Malta	400,000	Sydney—Mortlake	500,000
Copenhagen (Second)	2,500,000	Manchester	3,500,000	Sydney—Mortlake (Second)	500,000
Coventry	600,000	Manchester (Second)	3,500,000	Syracuse, N.Y.	850,000
Coventry (Second)	600,000	McKeesport, Pa.	500,000	Taunton	225,000
Croydon	1,250,000	Merthyr Tydfil	300,000	The Hague, Holland	1,000,000
Croydon (Second)	625,000	Middlesbrough	1,250,000	Tilburg, Holland	400,000
Croydon (Third)	625,000	Newburgh, N.Y.	350,000	Tottenham	750,000
Deventer, Holland	150,000	Newburgh (Second)	250,000	Tottenham (Second)	750,000
Deventer, Holland (Second)	200,000	New York	1,200,000	Tottenham (Third)	350,000
Dorking	150,000	New York	4,000,000	Tottenham (Fourth)	1,000,000
Dublin	2,000,000	North Middlesex	150,000	Tunbridge Wells	1,000,000
Dublin (Second)	2,000,000	North Middlesex (Second)	200,000	Utrecht, Holland	1,000,000
Dunedin, N.Z.	150,000	Norwich	1,000,000	Utrecht, Holland (Second)	1,000,000
Dunedin, N.Z. (Second)	275,000	Ostend, Belgium	100,000	Waltham	400,000
Durham	200,000	Perth, W.A.	125,000	Wandsworth & Putney	1,800,000
Eastbourne	1,250,000	Port Elizabeth, S.A.	400,000	Watford	300,000
Edinburgh	2,000,000	Portsmouth	1,000,000	Watford (Second)	350,000
Epsom	225,000	Posen, Germany	450,000	West Ham	1,500,000
Falmouth	150,000	Posen, Germany (Second)	700,000	Winchester	225,000
Faversham	200,000	Preston	1,400,000	Zwolle, Holland	200,000

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Taunton (2nd)	350,000	Brussels—Ville (4th)	350,000	Berlin-Charlottenburg	2,500,000
Bognor	100,000	Innsbruck, Austria	200,000	Bochum, Westphalia	530,000
Bournemouth (2nd)	500,000	Marlborough	100,000	Brussels–Anderlecht	350,000
Vienna	3,500,000	Flensburg, Sleswig	300,000	Leigh, Lancs.	350,000
Maastricht, Holland	200,000	Weston-super-Mare	300,000	Stockport (3rd)	400,000
Antwerp, Belgium (2nd)	1,000,000	Wexford, Ireland	100,000	Agram, Croatia.	200,000
Tottenham (5th)	1,000,000	Budapest, Hungary	50,000	Bruges, Belgium	200,000
The Hague, Holland (2nd)	500,000	Swindon	300,000	Liége, Belgium (2nd)	750,000
Hampton Court.	500,000	Reading	1,000,000	Lemberg, Galicia	260,000
Lea Bridge (3rd)	400,000	Oberhausen, Germany	175,000	Leeuwarden, Holland	400,000
Dublin (3rd).	650,000	Malmo, Sweden	350,000	Stockholm	1,500,000
North Middlesex (3rd)	75,000	Ipswich	750,000	Romford (2nd)	350,000
St. Gallen, Switz. (2nd)	225,000	Winchester (2nd)	125,000	Cracow, Galicia	200,000
Brussels—St. Josse	1,000,000	Zwolle, Holland (2nd)	200,000	Berlin-Rixdorf (2nd)	700,000
Dundee	1,500,000	Alkmaar, Holland	400,000	Mayence	700,000
Bridgwater	200,000	Leiden, Holland	500,000	Guildford (2nd)	200,000
West Ham (2nd)	800,000	Poole	1,500,000	Kiel	1,000,000
Brieg, Silesia	100,000	Berlin-Rixdorf	650,000	Chigwell	350,000

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EDITORIAL NOTES—GAS, &c.

Parliamentary Injustice to Private Enterprise.

FORTUNATE indeed are those gas companies who have recently been in Parliament, or who are in Parliament and have agreed with their adversaries; for whether report be good or ill, the present Parliament are prepared, when desired, to make easy the way to municipal ownership. Warning of this was made in these columns immediately after the General Election, when it was known how large was the number of those schooled in municipal chambers who had secured seats in the new Parliament, and when the Labour Party promulgated their programme, which had at its head and front "Municipalization." The number of Labour members may be only between sixty and seventy; but that number in itself does not convey its great potential force. These members are the representatives of the hosts of organized labour; and therefore towards them as well as to the apostles and disciples of the tenets of advanced local administration, the attitude of the Government is one of abject obeisance and support. Week after week there has been fresh exposure of this, and of the set purpose of the Government to repress and oppress private enterprise by helping to promote municipal adventure to quite dangerous extremes. Protection and free trade are political matters which extend beyond our purview; but we are at liberty to say that no party by whom the principles of free trade are venerated can honestly defend the abridgment of the scope for private and individual enterprise. That is, however, what is actively being done; and there are abundant signs that the inconsistency gives no trouble. The avowals of present Ministers during the election, the remarkable procedure on the London County Council Electricity Bill, and the innovations in gas legislation this year, are indeed significant of an expanding danger.

In connection with gas legislation, there was, in the first place, the introduction of a suspensory clause into the Merthyr Tydfil Gas Bill; then the measure promoted by the Pontefract Corporation for giving them compulsory powers of purchase of the Gas Company's undertaking (which is a statutory concern) was endorsed on the lamest of reasons; and now during the past week the Sutton, Southcoates, and Drypool Gas Company, who are promoters this session, have had imposed upon them, at the instance of the Hull Corporation, a suspensory clause in like terms to those of the Merthyr Tydfil precedent. We have a few words to say on this suspensory clause; but its injustice will be emphasized by pointing out that the Hull Corporation did not, in urging the question of purchase, assign any ground for preferring their request, other than that it would be in the interests of the ratepayers. There was not the slightest stain on the reputation of the Company—no allegation of mismanagement, no misapplication of funds, no neglect of the interests of the consumers; but, on the contrary, gas is sold at 2s. 4d., and every possible convenience the Company can offer—Mr. Corbet Woodall and Mr. John Holliday, the Company's Engineer, clearly testified—is at the command of the consumers. Nevertheless, the Corporation submitted that it would be in the interests of the inhabitants of the city (how so they did not trouble themselves to prove) that the undertaking should be transferred to them, and therefore that no further powers should be conceded to the Company. That was all their case; and no case, considered in conjunction with the result, could present in more pronounced manner the invitation to municipalities to ask, and the promise that they shall receive. The Corporation did not get exactly what they asked for—the rejection of the Company's measure, in order that they might introduce a Purchase Bill; but they obtained this new suspensory clause, which is the nearest relation to a purchase clause yet begotten.

The object of the suspensory clause (as will be remembered in connection with the Merthyr Tydfil precedent) is to suspend the operation of the Act to be obtained by the Company in the present session till the time expires within which the Corporation would have to promote a Purchase Bill in the next session of Parliament, and then in that event until the fate of the Purchase Bill is decided, with the exception of the raising of a specified amount of capital to enable the Company to carry on their business. But, as has before been explained, the clause does not, as in the case of a purchase clause, inhibit the Company from opposing on the principle of purchase. Their acts are not limited, and their mouths are not closed, in offering strenuous opposition to expropriation. In the opening lines of the suspensory clause, however, are these words: "Nothing in this Act "contained shall be deemed to prejudge or prejudice one "way or the other the question of such purchase." The clause is contained in the Act; and we maintain that that clause in itself—its very appearance in the Act—will in a not inconsiderable degree "prejudge" the question of purchase, and will "prejudice" the Company unwilling to part with their concern. The clause will be a direct and powerful incentive to the Corporation taking action in the next session of Parliament to obtain powers of purchase; and its inclusion in the Act will be dangled before the ratepayers as an attestation of the good will and favourable inclination of Parliament towards purchase. "We have got this clause," the Council will say, "and we ought to take advantage of it." Therefore both in the Council and with the ratepayers, the clause is sure to have an influence prejudicial to the Company; and the votes obtained through these means favourable to purchase will be brought before Parliament as the public expression on the propriety of purchase. It is all monstrously unfair to the Company; and it is by such unjust methods, unless we are greatly mistaken, that more than one Gas Company will, in the near future, be dispossessed of their property. If, in truth, purchase of this concern at Hull is in the interests of the consumers to-day—and we categorically deny it—it is not a new-born thing; and the Council should have come before with a "fair and square" Bill, and invited Parliament to give them the necessary power to acquire. Instead of this, and in the case of a Company with a clean record, they make a mild appeal to a Parliament of most amicable disposition towards municipal trading, and first get in the thin end of the wedge which is to effect the final cleavage. This being the twice demonstrated position of affairs, our counsel to gas companies is—if their circumstances are such that they can do so without detriment to the interests of their consumers and themselves—to delay appearance in Parliament, unless there is a fair prospect of agreement with the local authorities. Saying this is not going too far when these recent acts are associated with the words uttered by the President of the Board of Trade (Mr. Lloyd-George) when the London County Council Electricity Bill was up for second reading: "In a case of this sort, pri-"ority ought to be given to the scheme of the ratepayers."

There is one other matter on which the Hull Corporation have, to our mind, shown supreme selfishness. The Sutton, Southcoates and Drypool Company are one of those unfortunates who have in an old Act—in this case an Act of 1867—a clause which gives the Corporation the right to a supply of gas for public purposes at the lowest price charged to any consumer. The Company asked that, circumstances having changed, the clause should be amended by the insertion of the words "for lighting purposes," which would have fully defined the intention at the time it was drafted. No one dreamed in 1867 that gas would ever be used as it is now to such an extent for purposes other than lighting. The new conditions were not then contemplated; and it is unfair and unjust to insist on the observance of the clause when a Company, for the benefit of the consumers, suggest that it should be partially remodelled to give effect to the

original intention. To compel the observance of the strict literal meaning of the clause, read in the light of the modern extensions in the business of gas supply, is to check the usefulness of the Company to the community and its industries, and to place the Company at a disadvantage in competition. During the proceedings on the Pontefract Bill, the Chairman of the Police and Sanitary Committee said: "It would be a "great advantage if the Corporation reduced the price of gas "as proposed when used for power and cooking purposes." In the adjoining room, Major Seely and his colleagues are told that there is in Hull a great demand for gas for power; but this Committee refuse to allow the amendment of an ancient clause, in a manner giving the Corporation their full original privilege, which, applied to the altered circumstances, stands as a bar to the Company going the greatest possible length in the direction in which the Chairman of the Police and Sanitary Committee says there is advantage to be obtained by an industrial community. The Hull Corporation have selfishly secured the perpetuation of what has become, without emendation, an unjust provision. They have obtained something beyond what it was intended forty years ago they should have; and their action does not show any marked appreciation of the first principles of equity.

Final Report of the Paris Gas Company.

In another part of the "Journal" will be found an abstract translation of the report on the past year's working of the Paris Gas Company, which, with the accounts, was presented by the Liquidators of the Company at a general meeting of the shareholders held a few weeks ago. The record of twelve months' progress in gas supply in any large city cannot fail to present some features of interest; and when the city is Paris—the "City of Light," as it is appropriately called—the interest is proportionately increased. The particulars given elsewhere are, however, worthy of special attention from the fact that they constitute the closing chapter in the history of an undertaking which for half-a-century performed a most important work, under, at times, exceptionally trying conditions. In the course of that period, five exhibitions on an increasingly large scale were held; and there was a terrible time when the city was attacked by foes both within and without. But whether Paris was *en fête* or in a state of siege, the supply of gas had to be kept up; and the Company proved themselves equal to the occasion. It is unnecessary to refer here to the progress of the undertaking since its formation in 1855, as this was done in a short series of articles which appeared early in the year; but reference may be made to two incidents in which the Company did conspicuous service to the gas industry at large. The first was the excellent show of high-power gas-lamps made in the early days of the competition of the electric light; and the second was the marvellous display of high-pressure incandescent gas lighting in the Champ de Mars on the occasion of the Exhibition of 1900. When, soon after the introduction of the Jablochkoff "candle," the interests of gas were threatened, the Paris Gas Company were among the first to demonstrate what it was capable of doing in the way of street lighting. The brilliant illumination of the Champ de Mars is too fresh in the recollection of many of our readers to need recalling to mind. Its outcome has been the supersession of the ordinary flat-flame burner all over Paris; for at the end of last year there were only 2013 of these burners in use, compared with 52,200 on the incandescent system.

In the fifty years of the Company's existence, Paris has grown, and the demand for gas has necessarily increased; but it has done so in greater proportion. In 1885, the population was rather more than a million; and they were satisfied with about 1412 million cubic feet of gas—say 1400 cubic feet per head. It is now $2\frac{3}{4}$ millions; and they consumed last year nearly 14,000 million cubic feet of gas, or at the rate of rather more than 5000 cubic feet per head. In this connection, it may be pointed out, that of the entire bulk of gas burnt last year, no less than 5740 millions, or 41·17 per cent., was used in the daytime. Of this total, rather more than 494 million cubic feet were consumed for motive power—being an increase of 15 millions in the year. This leaves a substantial quantity attributable to gas-stoves, the use of which has been greatly stimulated of late years by the Company's show-rooms and the adoption of "free "fitting" among the poorer consumers. The extent to which the latter helped to increase the consumption of gas last year may be appreciated from the fact that while the new ordinary consumers placed upon the books numbered 9157, no fewer than 16,252 of the other class availed themselves of the facilities afforded by the Company for enjoying the advantages of gas.

Turning to financial matters, during the greater part of the period of their concession, the Company charged for gas, under the terms of their Treaty, the very high figure of 6s. 9d. per 1000 cubic feet. But it may be remembered that a few years ago an arrangement was come to by which the price was reduced to 4s. 6d. It was some time before the consumers could obtain this concession, owing to the participation by the City in the profits of the undertaking. Last year, these amounted to nearly £1,812,000, of which £1,348,000 had to be divided equally with the Municipality, who came in for £674,000, with £9924 in addition as compensation for the reduction in price. Reserving £130,000 of the total to meet the expenses attending the liquidation, they still had, in round figures, £554,000 to put into their Exchequer. The Company had a balance of £1,139,711, which was subject to certain deductions, including the interim dividend of 12 frs. 50 c. paid in October. There was, however, sufficient to pay a final dividend of 61 frs., making 73 frs. 50 c. (£2 18s. 6d.), and leaving a carry-over of £8418. Both the Company and the Municipality, therefore, have good reason to be satisfied with the final year's working of the gas undertaking.

Shareholders have certainly come off very well indeed. They not only have their dividend, but they will participate in the distribution of the special reserve fund set apart for liquidating the shares, as well as of the 90 million francs to be paid by the Municipality for the works and plant taken over as from the 31st of December last. They will also be entitled to a portion of the profits of the current year's working. They get about 470 frs. for each share of 250 frs. nominal value; and they have been in the enjoyment of dividends which for the past thirty years have only on two occasions (in 1898 and 1899), consequent upon a decree of the State Council, been less than 60 frs. per share. The Company's responsibility for the gas supply of the city having now ceased, it remains to be seen whether the Municipal Council will decide on taking sole control of it as from the end of the current year, or will adopt the scheme of deputed management which has been proposed by the Prefect of the Seine.

Workmen's Compensation Bill.

During the past week, the Workmen's Compensation Bill has been under the consideration of the Standing Committee of the House of Commons on Law, and with notable results. In the first place, the proposal of the Government to reduce the period of disablement during which the employer is not liable in respect of an injury to a workman from a fortnight to one week, has had to give way to an amendment (proposed by a Labour Member) reducing the period to three days. This was carried against the Government by 30 votes to 21. In the course of a lengthy discussion upon this amendment, it was urged in opposition to it that it would be an encouragement to malingering—a suggestion which was strongly repudiated by the Labour Members of the Committee, who denied also that malingering prevailed to any appreciable extent under the present arrangement. On the other hand, Mr. Cory, for the employers, stated that a reduction of the period even to one week would increase the burden on the employers by at least 25 per cent.; and he offered, on their behalf, that if the present period of a fortnight were retained, they would agree to compensate for serious accidents from the date they happened, and for trivial accidents likewise, provided they lasted for over a month. This shows that, on the mere question of principle, it is generally agreed that compensation should commence from the date of accident; if adequate security be provided against malingering. As a matter of course, the shorter the period ultimately decided upon, the greater must be the number of trivial accidents for which compensation will be claimed, and by so much the heavier will be the burden upon the employers. But is this burden likely to be increased to any extent by what is known as "malingering"? It is at least within the bounds of possibility that the anticipations of the employers in this respect may not be realized. They can hardly be founded upon experience, since what experience there is of

the shorter period does not lend them much support. Mention may be made in this connection of the record of the South Metropolitan Gas Company of accidents that have caused incapacity for three days and upwards, which was recently referred to by Sir George Livesey, and noticed in the "JOURNAL" for March 27. The Company have a system of inquiring into all accidents by a jury of workmen, which cannot but be productive of the best results both to employers and employed, and appears to be well deserving of extensive imitation.

Another highly important matter—though of less immediate concern to readers of the "JOURNAL"—in regard to which the decision of the Committee has been adverse to the proposal of the Government, is that relating to the exclusion from liability for accidents (excepting under specified conditions) of the small employer, having not more than five workmen at the time of the accident. This was so manifestly a weak part of the Bill that no surprise need be felt at the almost unanimous opposition to it; and though the Home Secretary and the Solicitor-General both pleaded strongly for its retention, they had to admit that it was logically unsound, and only based on broad consideration of practical politics. The chief objection urged on behalf of the Government to the inclusion of the small employer was the difficulty of compelling insurance, in order to secure compensation in case of accident. When once a start is given, however, the movement is likely to be rapid enough; and the decision of the Committee last Thursday may be found to have brought the question of compulsory insurance quite within the range of practical politics. It is announced that the Government are prepared to consider the question of the admission of classes who are excluded under the present law, and also the inclusion of shop assistants, clerks, and domestic servants, subject to certain limitations. It is probable, therefore, that, when the Bill takes its final shape, it will not be found lacking in thoroughness, whatever may be its deficiencies in other respects.

Disposal of Gas Profits.

A highly interesting debate on the subject of the respective claims of the reserve fund and the rates to be considered in connection with the profits realized on the past year's working of the Rochdale Corporation Gas Department appears in another part of the "JOURNAL." The amount at disposal was the substantial one of £17,692; and of this it was thought by a majority of the Gas Committee that £5000 should be allocated to reserve—the remainder being handed over to the relief of the rates. This contribution, however, handsome as it would have been, evidently failed to meet the ideas of the Council; for it appears from the debate in question that, at a meeting in committee, they decided to appropriate the whole of the profits in aid of the rates. This it was that led the Chairman of the Gas Committee to, as he said, "put on record some important facts in reference to the financial position of the department." After this had been done, in a plain but forcible manner, the Mayor gave it as his opinion that, in his desire to look after his own department, the Chairman had gone a little farther in his remarks than was wise. But had he? Surely the Chairman of the Gas Committee is in a position to speak authoritatively on matters which concern the Corporation gas undertaking; and therefore it is only fair to assume that his statements are accurate. If this is so, there can be no doubt he did the right thing in strongly warning the Council of the results that would attend a continuation of the present policy. The Mayor said "they ought not to let it go forth from the Council—because they were a little sore at the profits being taken from them—that the works were in an uneconomical condition for production;" but apparently the Chairman of the Committee was convinced that desperate measures were necessary, and did not hesitate to take them. To his mind the building up of the reserve and depreciation fund is more important than the relief of the rates; and in this very many people will be inclined to agree with him. How much—or how little—the "soreness" that was hinted at by the Mayor had to do with the attitude taken up by the Chairman, it is impossible to tell; but it should be noted that his own explanation was that he wanted the outside public to understand the position, and also that he had made the statements he had in justice to the Manager (Mr. T. B. Ball), "who, from time to time, in the interests of the undertaking, had called attention to the unsatisfactory manner in which the Council were dealing with the finances of the Gas Department." Another speaker made the somewhat astonishing assertion that the amount of the rates for one year had been abstracted from the profits of the department during the last six years. If this is the case, the remark of the Mayor, "that sometimes the Council were fairly entitled to a share of the profits," can hardly be said to adequately illustrate the policy that has been adopted. Though it may give rise to some little feeling temporarily, it is impossible to think that the discussion can in the long run be productive of anything but good.

Abandoned or Postponed?

In spite of some demur on the part of the Chairman of the Gas Committee as to the correctness of the phraseology, the Devonport Corporation on Thursday last confirmed a report in which the Committee are said to have the intention of abandoning that portion of the gas-works extension scheme which has not yet been carried out. "Abandon" is, according to the Town Clerk, the proper word to use. It can, however, hardly be meant to be employed in the sense that no further alterations and enlargements are to be carried out. Messrs. Stevenson and Burstal's scheme in 1902 provided for the remodelling of the works, including the erection of a new retort-house and coal-store, water-gas plant, purifiers, condensers, holder, governors, meter, &c. Some of these works have been carried out. New purifiers and condensers were first put down; and the water-gas plant—about which there was such a strenuous battle—is practically completed. The gasholder, too, is nearly finished, and will be brought into use before winter comes again. But the retort-house is still to seek. In their report to the Council, Messrs. Stevenson and Burstal estimated that a saving of £8825—or about 7½d. per 1000 cubic feet of gas made—might be effected by the provision of new retorts and other works of modern design. Some part of the new works Devonport has; and in respect of purification and storage, the works are more up-to-date than when the Corporation acquired them. Economies are, however, less to be expected in these directions than in the retort-house; and if the Corporation are to supply cheaper gas, it will still be necessary to lay out more capital and complete the remodelling of the works. Abandon may, therefore, be really the correct word to use if it is applied to a particular scheme. It can hardly, we imagine, mean that the Gas Committee have decided not to proceed further with the extension and improvement of the undertaking.

Wages in South Wales.

As was stated in last week's "JOURNAL" would be the case, the Conciliation Board of the South Wales and Monmouthshire coal trade, at their quarterly meeting last Thursday, had to consider a demand put forward by the workmen's representatives for an advance in wages of 3¾ per cent. as from the 1st prox. The present rate (which is the minimum) has been in force since the new agreement for the continuation of the Conciliation Board came into operation at the beginning of the year; and the men contended that the improvement that has meanwhile taken place in the selling prices of large and small coal, but more particularly the increased volume of trade, and the bright prospects of a still further gain in both respects, should now be taken into account. It was stated that during last quarter there had been an increase in the volume of trade of no less than 800,000 tons. On behalf of the owners, however, it was urged that the matter should be governed by the selling prices, and that these had not risen to anything like such an extent as would warrant the advance in wages that was demanded by the men. The question was debated at great length; but eventually the owners decided to offer an advance of 2½ per cent., beginning with next month. This was put forward in a spirit of conciliation, and was accepted by the men's representatives in the same light. Thus there will be no appeal to the Independent Chairman of the Board; and once more it has been demonstrated that much good may come of a mutual conciliatory attitude in the discussion of outstanding questions between employers and employed. It is to be hoped that this agreement will pave the way to an early and peaceful settlement of the other matters which have of late led to disputes in the South Wales coalfield.

NOTES FROM WESTMINSTER.

THE principal events of the past week in the Committee rooms, and there is again one of special importance, are dealt with in the succeeding paragraphs.

Another Suspensory Clause. The Sutton, Southcoates, and Drypool Gas Company came to Parliament this year with a Bill of a most ordinary character, and they clearly had a right to anticipate that it would go through Parliament without anything prejudicial to their interests being placed in it. In the present Parliament, however, no one knows what is going to happen; and even the Sutton, Southcoates, and Drypool Company have learned that the prayer of a Corporation to Parliament now takes precedence of a good record and a conscientious regard for duty. The Company merely asked primarily for the consolidation of their capital, additional capital, a renewal fund, the variation of the clause in the 1867 Act referring to the charge for public lighting, and permission to change their name to the "East Hull Gas Company." The main point upon which the Corporation opposed was with regard to the alteration in the public lighting clause; and they also desired that a purchase clause should be imposed upon the Company. The latter matter for the moment is the more important. The Company have overspent their capital by a few thousands, but not to an amount that calls for stricture. They are supplying gas at 2s. 4d., less discounts; and the price to the Corporation is 2d. less than to the general public. Both Mr. Corbet Woodall and Mr. John Holliday, the Company's Engineer and Manager, were able to give the Company an excellent character when before Major Seely's Committee last week; and Mr. F. J. Bancroft, the Corporation Gas and Water Engineer, was equally conscientious in the evidence he likewise submitted. No trumpery charges fell from him; but he bore witness, fairly and freely, to the benefit the consumers in the Old Town of Hull have gained under the Corporation management of the distribution of gas delivered (in bulk) for that district to the Corporation by the British Gaslight Company. Of course, the comparison was with a past old condition of affairs. He also gave his personal views as to the amount of the capital the Sutton-Southcoates Company would require over a number of years. But not a single word to tarnish the good reputation of the Company. Notwithstanding all this, there was not the slightest difficulty on the part of the Corporation in getting inserted into the Bill a clause corresponding to that put just recently into the Merthyr Tydfil Gas Bill—not a purchase clause, but a suspensory one, which is not to "prejudge or prejudice" the question of purchase one way or the other. The idea is to give the Corporation an opportunity of introducing a Purchase Bill next session, which is to be fought entirely—at all events this is the suggestion—on its merits. Meantime, the new powers conferred on the Company are to remain in suspension, so that the value of the undertaking may not be enhanced or depreciated by the Act. The issue of capital under the Act is also to be deferred, excepting to an extent not exceeding £14,000 which is to cover the £7236 18s. 5d. expended beyond the 1867 powers. Some comment on the matter is made in our editorial columns; but here it may be simply pointed out that in no way did the Corporation prove that the public interest would be in any way enhanced by purchase. Under the circumstances, the insertion of such a clause is both unfair and uncalled for; and its opening profession of not prejudging or prejudicing the case of purchase is little better than a blind. It is bound to influence it. The Company did not get the amendment of their public lighting clause. It was shown that there is a great demand for gas for power purposes; and the fact that the Corporation insist on retaining the privilege of gas supply at the lowest price charged to any consumer that was obtained in far different times, when the gas was used—as far back indeed as 1867—almost exclusively for lighting, and prices charged were higher than now, will affect the ability of the Company in getting to the lowest possible point in assisting the industry of the district. The Corporation also secured the Rochester clause, giving control over the depth and position of mains, with a reference to arbitration in the event of dispute.

The Pontefract Purchase Bill. Last week there appeared in the Notes and the "Parliamentary Intelligence" the history of the proceedings before the Police and Sanitary Committee on the Pontefract Corporation Bill, by which it is hoped to get through Parliament the proposed power of compulsory expropriation of the Gas Company's works. The Committee—in a manner which seemed to indicate that they were acting on a principle of the present parliamentary policy rather than adjudicating on the fairness or unfairness of the matter before them and the propriety or otherwise of transfer from the consumers' point of view—passed the purchase part of the measure. On Monday, clauses came up for consideration; and then the Corporation did not get things all their own way. It is only right, in the case of purchase powers, that notice of purchase to the Company on the part of the authority should not be unduly prolonged; and the Committee in this case have limited the period of notice to three months. The shorter the period the better, because the purchase power can only act as a deterrent to the enterprising efforts of the Company which were awakened several months preceding the promotion of this Bill. Before the Committee's decision, the promoters were particularly concerned to instil into the minds of the members, the idea that the Company had not been doing their duty to the consumers, though they are supplying 16-candle gas at 2s. 11d. net. It furnishes rather a good comment on this line of evidence to observe that the Corporation had continued in their Bill the Company's old maximum price of 5s. 6d; and through Mr. Stevenson, after the decision, they stuck out for 4s. as being a "fair maximum price"—advancing the reason that works of the size of Pontefract ought not to be compared with those of the size of Wakefield and Leeds. Then, again, when it was a question of getting as long a period as possible for the repayment of loans, the character of the works underwent a transformation in the eyes of the Corporation; and really Mr. Stevenson quitted the witness chair leaving the impression upon those who heard his latest evidence that these were not, taken on the whole, such a bad sort of works after all. The Corporation did not get the half century they required for the repayment of the purchase money; but 45 years was allowed. This is longer than has been granted in most cases in recent years. But money borrowed for extension and construction work is to be repaid within 25 years.

Stand-by Supplies. The Unopposed Bills Committee of the House of Commons have discarded the useful and fair provision in the Mirfield Bill, protecting both the gas undertaking and their consumers in connection with stand-by supplies. The reason given for their action is that they could hardly allow it without a precedent. The Lord Chairman evidently did not think so; and it would not have been beyond the power of the Committee to have taken part in creating a precedent if really one were wanted. As a matter of fact, precedents are to be found in Electricity Bills.

Gas Companies and Electricity Supply. The Board of Trade are getting a little tired of Provisional Order mongers—that is to say, firms of electrical engineers who obtain an Order, and then try to bring together a Company for the development of a scheme, and to take over the powers sought—of course, to the profit of the firm holding the Order. It is therefore a pleasure to see that the Board, having the choice between a firm of electrical engineers promoting a Provisional Order and the Electric Lighting Bill of the Ascot District Gas Company—a statutory Company, with large interests concentrated in the district—have refused the firm in question the Order they sought. This action cleared away all opposition from the Gas Company's Bill; and the Local Authorities very wisely decided to let the Bill proceed. Of course, the wisdom of the Gas Company will only be proved by the issue of their enterprise. The Bill has been before the Unopposed Bills Committee; and so has that of the Brixham Gas Company, which seeks to confer similar powers. The Lord Chairman has also reported to the House of Lords that all opposition to the Crediton Lighting and Power Bill has been withdrawn. The three measures conferring electric light powers on Gas Companies will now, it is expected, proceed without further molestation.

Power Gas and Electricity. The West Cumberland Electricity and Power Gas Company's Bill has been brought under notice during the week; it having had a short innings before the Earl of Lauderdale's Committee. The Company are proposing a capital of £450,000. An exceptional feature about their scheme is that it contemplates the supply for power purposes of blast-furnace gas, which the promoters proclaim their ability to supply at 7d. per 1000 cubic feet. No limitation was proposed in the Bill as to the percentage of carbon monoxide which the power gas may contain; but the Bill will proceed with a clause in it defining power gas to mean "gas approved by the Board of Trade and the Secretary of State for the Home Department." The Secretary of State for the Home Department has already announced that the Esk Vale modification of the usual provision might be allowed, to the effect that "the gas shall not contain more than 14 per cent. of carbon monoxide, or such higher percentage as may be approved by the Secretary of State." Of course, the Company are going to distribute—that is, if the proposals are consummated—electricity as well; and they are meeting with practically no opposition. They had, however, to enter upon certain negotiations with the Corporations of Whitehaven and Workington; and they have come to settlements. The Whitehaven Corporation, according to the bargain, will sell the Company the town's electricity undertaking for £25,000 any time between March 31, 1907, and March 31, 1910. But there is the peculiar arrangement attached that the Council are to be bound to take a supply of electricity at 4d. per unit for public lighting purposes—a high price, notwithstanding that it includes the maintenance of the lamps. After 1910, this rate is to be reduced to 3d. per unit. The maximum charge for private lighting is to be 4½d. per unit. These are terms that will be of assistance to the gas undertaking. The Workington Corporation have secured protection, in the event of their taking electricity for distribution in bulk from the Company. The latter are not to supply electricity within the Corporation area, nor are they to lay mains for the supply of power gas in a defined part of the borough, and in no part of the borough are they to supply power gas, except with the consent of the Corporation, other than for use in engines which shall (in the case of each consumer) have a total capacity of not less than 50-brake horse power, including at least one engine of not less than 25-brake horse power.

Electricity Bills. The Hybrid Committee on the London County Council Bill, who are at the present time monopolizing the Grand Committee Room in Westminster Hall, are taking things fairly easy. They are, in fact, setting a very bad example to the Trade Unionists of the country, who are every ready to get hours shortened and pay lengthened. These gentlemen of the Hybrid Committee have been sitting for a fortnight now, or it will be more correct to say their sittings have come within a fortnight; and they have taken plenty of time off. Each week so far they have started their labours on Tuesday, and ended them on Thursday; and 11.30 to 4 o'clock are the hours that have embraced the proceedings of each day. This sort of thing would not meet with the sympathy of Mr. John Burns, though it would of not by any means a few trades unionists of the rank and file. Elsewhere in this issue certain of the features of the County Council Bill are reviewed; and therefore here only three or four points that have punctuated the evidence of Mr. J. H. Rider, the Electrical Engineer to the Council's Tramway Department, and Mr. Robert Hammond, need notice. There is no doubt that the Bill is a most dangerous one for the existing electricity distributors. Not only are the Council taking big powers of supply, but they are attempting to arrogate to themselves through the Bill extensive powers of control over existing undertakings. The full import of clause 35 of the Bill has only been made plain during the cross-examination of some of the witnesses. This is a clause to give the Council the right of appeal, if they think fit, to the Board of Trade for the periodical revision of the charges of the authorized undertakings; and now it is learned that it is intended that this clause shall apply to existing undertakings whether or not they take power from the Council. It is an insolent proposal; and a most dangerous power to place in the hands of the Council. The only modifying promise that the Committee have yet made is that the clause shall not apply to existing contracts. The Council, however, have tried to ingratiate themselves a little with the opposition by withdrawing their proposal to supply Government departments and street lighting authorities without the consent of the authorized distributors in each case. The question has also been discussed, but not thoroughly, as to whether the combination of the existing undertakings would not be preferable to the Council scheme. Such a manner of solving the electricity problem of London would spoil the Council's ambitious project. Therefore, quite naturally, Mr. Rider says that amalgamation would not be preferable; that, indeed, it would not be practicable until the existing undertakings have paid off their capital, though it would have saved capital expenditure in the outset if such a plan had been adopted instead of each district having its own separate supply system. Consulting engineers such as Mr. Hammond, so far as our observation goes, have usually advised local authorities to keep the whole business—lock, stock, and barrel—in their own hands. But, of course, circumstances alter cases; and so do clients' requirements sometimes. Counsel for the existing suppliers refer these gentlemen for an analogy to the benefits of the combination of the old Metropolitan Gas Companies into three Companies. The Commissioners of Works are going to bring evidence as to the damage done to trees and plant life from the products of combustion emanating from the generating-stations; Parliament having referred to the Committee the memorandum on the subject presented by Commissioners, as noticed in the news columns of the "JOURNAL" a fortnight ago.

On the subject of nuisance from generating-stations, the Borough Council of St. Pancras have a Bill going through as unopposed in which there is a clause which will, if it remains, acquit them of any liability to proceedings for nuisance. One or two other electrical undertakings are also seeking absolution in this respect. Why electricity undertakings should be privileged in the way proposed is not clear. Let a gas company's chimneys offend, and the local authority will indeed be an affable one who will not set the law in motion to bring to book the transgressors.

Another interesting item in connection with Electricity Bills in this session is that the Lancashire Electric Power Bill, which aroused to action the local authorities in the county of Lancaster south of the River Ribble, is now free to go forward, but with the powers cut in very close. The 1900 Act of the Company empowers them to supply in bulk, or on behalf of existing undertakings; and the present Bill was intended to allow them to supply direct to power consumers. The amalgamation of the forces of the local authorities has resulted in the Company amending the Bill in such manner as to prohibit them from supplying to consumers in any area where local authorities have the power to supply, except with their consent. The Company are similarly prevented supplying without the consent of any local authority who may within a certain period obtain powers of supply in any area.

Glamorgan Water Bill. After a great amount of preliminary talk and preparation on the part of the opposition, who had hoped to overthrow early in its progress the permissive Bill promoted by the Glamorgan County Council, the measure got before Lord Newton's Committee at the opening sittings last week, and occupied four days in its discussion. All told, there were seventeen Counsel—silks and stuffs about equally divided—representing hostile authorities. At the outset, however, the Committee declined *locus* to the London County Council and the Metropolitan Water Board, whose interest in the matter was somewhat remote. The other hostility came from the neighbouring counties to Glamorgan, and from local authorities who are in the enjoyment of fairly plentiful water supplies. It is an old cry in the Principality as to "Welsh water for Wales;" and there have been attempts in years past to stiffen opposition to distant cities obtaining the rights to Welsh sources of supply. But now when one of the County Councils of Wales comes along with the first proposal to do something really serious in the way of conserving the waters of the Principality, and to provide for the requirements of the needy districts, there is a greater amount of organized opposition than when the far-away city has sought to draw upon the Welsh sources. The Bill might have been made the base of a grand effectual co-operation of the Welsh interests. But, instead of this, it was described as nebulous, and aroused the opposition of the neighbouring counties, all of whom are jealous of one of themselves, and that one, taken as a whole, suffering the greatest privation in respect of water supply. The Bill, as a matter of fact, contains no definite scheme; it is entirely of a permissive character, to enable the Council to take the preliminary steps in providing for the future. There have been great difficulties experienced by the smaller authorities in obtaining a proper supply of water for the populations springing up in the county; and the Council were seeking power to expend money (limited in its amount per annum) in first ascertaining where suitable supplies can be obtained, and, secondly, in promoting combinations of local authorities to take advantage of those supplies. That was all; as the combined authorities would then have to come to Parliament in the ordinary way for powers. The experience of the County Council is that the machinery for dealing with local authorities who neglect to provide an adequate water supply is defective; and the powers they ask for, in their opinion, will do something towards remedying this state of things. In making their surveys, the Council proposed to go outside their own county; and the brunt of the fight fell upon this. In the event, the Committee deleted the power as to the creation of Water Boards, and made it clear that the Glamorgan County Council are to have no preferential rights as the result of making surveys. It is also the view of the Committee that, if the Council apply for further powers, they should do so in conjunction with adjoining districts.

GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 461.)

UPON the principle that "all is well that ends well," the Stock Exchange last week had a decidedly improved time. At the outset, things did not look at all promising. The Turkish difficulty, the monetary prospect, and the Irish Loan question were among the the chief factors to keep things uneasy; and Consols and the gilt-edged divisions felt the strain. Gradually the tension began to relax; but so sensitive were the markets, that more than once a sudden change would come on in the afternoon, and a fairly bright day would have a dull close. At length the improving tendency remained undisturbed—thanks, in some degree, to the fortnightly settlement going through without mishap; and the better state of things lasted till the close. The Money Market was rather shy and stiff at first, watching how the Bank rate might jump on Thursday; but, when the 5 per cent. bogey was dispelled, rates for short loans and for discount eased materially. Business in the Gas Market was quieter—mainly owing to dealings in the biggest issue being less agitated than they were the week before. The tendency was favourable; several quotations advancing, while, *per contra*, only two or three of the South American issues were weaker. In Gaslight and Coke, the ordinary was only moderately active, but was firm. Prices ranged from 96½ to 97⅞—a rise of 1 in the quotation. The secured issues were also moderately active, and were firm. The maximum changed hands at from 87½ free to 88½; the preference at from 107 to 108¾; and the debenture at from 85⅜ special to 87. South Metropolitan did a little more business than the average of late—prices ranging from 125½ to 127 special. The debenture was done at 87 and 88. Commercials were almost wholly neglected; the only transaction being one in the 4 per cent. at 115. The Suburban and Provincial group contrived to furnish a rather better contingent to the operations of the week. Alliance old marked 21⅜, ditto new 14⅞ and 14 15/16, Brentford old 267, ditto new 203 and 204 (a rise of 3), British from 42 to 42⅝, South Suburban debenture 133½, and West Ham preference 124. Brighton "A," and Hastings 3½ per cent., advanced. In the Continental Companies, nothing was done except in Imperial, which was especially busy *ex div.* after the conversion. Briefly, this operation gives to the proprietors a bonus of stock equal to 30 per cent. of their holdings; and upon this augmented holding, a dividend of 8 per cent. is paid. As 8 per cent. upon £130 is £10 8s., the operation increases the former 10 per cent. dividend upon £100 by the sum of 8s. Transactions on the old footing ranged from 233 special to 235½; and on the new footing from 175½ free to 177½. The debenture was marked at 97. Among the undertakings of the remoter world, Bombay old changed hands at 7½, ditto new at 5 (both *cum div.*), Cape Town at 16⅞ and 17⅛, Monte Video at 11¾ and 11 13/16, Buenos Ayres at 12⅜ *cum div.* and 12 *ex div.*, Primitiva ordinary at from 6 9/16 to 6¾, ditto preference at 5⅜ and 5 5/16, ditto debenture at 98¾, River Plate at 12¾, *ex div.*, San Paulo at 14 and 13½, and ditto debenture at 51½.

THE L.C.C. AND THEIR ELECTRICITY SCHEME.

In "Notes from Westminster" last week, a few general remarks were made regarding the commencement of the proceedings of the Hybrid Committee (with Mr. Luke White as Chairman) who are charged with the consideration of the whole question of the supply of electrical energy in London. By a Government of most amiable tendency towards municipal trading, while the reference in itself is broad, the field in which the Committee are to operate has been narrowed and shortened by limitation to the consideration of a single scheme, and that the one of the London County Council. Their project as adumbrated in the Parliamentary Bill has been hastily conceived; and it is, in most competent quarters, asserted to be ill-considered, and not at all suitable for the supply of electricity in bulk and for power purposes in the Metropolis. More will be known on this matter when the Bill and scheme have been thoroughly analyzed by those who so accuse of imperfection. There were two other schemes put forward with practically the same purposes in view. The promoters of the one—that was the St. Neots scheme—made themselves inconvenient to the County Council and the Government by their pertinacity in desiring that their Bill should go through the ordinary procedure, and not be hung up. The Government promptly gave the measure the happy dispatch. In the case of the other—the Administrative Company's scheme—the condescension of the Government extended to proffering them *locus* in respect of the County Council Bill; and this the promoters of that scheme philosophically accepted. By the course the County Council and the Government have taken in this matter, the Hybrid Committee have been deliberately hindered from carrying out the spirit of their reference by not having before them the various proposals, so that—if any such scheme is really needed in London—they might have had the privilege from the three of making choice of the one which, in their wisdom, they considered preferable. Their task would have been rendered easier, and the result might have been to the advantage of the ratepayers—if the Committee are not prejudiced in favour of municipal trading.

It is difficult to know whether "municipal trading" is altogether the right expression to apply to the trafficking of the London County Council. If it is, it is municipal trading extraordinary. So far as the Council are concerned, the ratepayer of London is a pack-horse, with his hind legs shackled. The opportunity of having a kick at a London County Council scheme is not allowed him. Whereas in ordinary municipal trading, the ratepayers have the right of saying "yea" or "nay" (though in most places they have in the past largely neglected it to their cost), in the Metropolis, the County Council can engulf them in financial responsibility—lavish, speculative, and mistaken—without any prior submission of their schemes to them. What is more, in this electricity scheme, the Council are proposing to extend their operations far beyond the boundary lines of the Administrative County of London—covering not only the areas of the Metropolitan Borough Councils, but the areas of other Local Authorities within whose territories the Council have no jurisdiction whatever. The scheme is an "awful example" of the effrontery and meddlesomeness of the Council. The previous trading schemes of the Council have landed the ratepayers in loss. Estimates have not been justified by the event; and there is nothing but the word of the Council's representatives—nothing but supposition and speculation—that the same thing will not happen in this case. The position is worsened in this instance by the fact that, if the Council's scheme receives the approval of this friendly Parliament, and there is loss, the whole of the loss, whether or not it is incurred outside the Administrative County of London, will fall upon the ratepayers within the area, and not on the ratepayers throughout the electricity supply area. The proposed supply area extends down the river beyond Erith and Grays; and, as was pointed out last week, it involves some 387 square miles, while the Administrative County of London only embraces about 117 square miles. From the London ratepayers' standpoint—the Finance Committee of the Council have themselves said so—the outlook in connection with this scheme is darkened by misgiving, which the care taken by the draughtsmen of the scheme to show that it is fenced about by safeguards, will not dispel.

For instance, it is proposed to apply the Northumberland or Bermondsey clause to the scheme, so that the price of supply will undergo revision in accordance with the profit and loss account of the undertaking. Therefore a maximum price cannot well be fixed in the Bill. But the Northumberland or Bermondsey clause can be completely nullified by the ability that the Council propose to have bestowed upon themselves to enter into long contracts at a defined price—such contracts to be exempt from the operation of the adjusting power of the Northumberland clause. This means that not only will the ratepayers of London be made responsible for losses incurred outside the Administrative County, but if, from any cause, these long contracts result in loss, someone has to bear that loss, and will that be the ratepayers or the other purchasers of electricity who come under the revision powers of the Bill? It seems conclusive to us that the loss would be the ratepayers'; for purchasers of electricity who were not under long contracts would soon find another source of supply, if the Council started making adjustments that enhanced the price. Parliament will not be dealing fairly by the unconsulted ratepayers in this matter if they do not take steps to ensure the omission from the Bill of such inconsistency as the Northumberland clause and the exemption from its operation of long contracts, and put in its place provision for the absolute defence of the ratepayers against loss. But we have our fears as to the Lower House at all events taking such a sensible view of their duty to protect the ratepayers.

That the "long-contract" class of business is what the Council are aiming at is clear; and that is the business that is to be freed from the control of the Northumberland clause. The main purpose of the Bill is, so Mr. Freeman, the leading Counsel for the County Council, stated in the course of his opening speech, to supply electrical energy to authorized distributors, and not to supply direct to any individual consumers in the areas of any authorized distributors in the Metropolitan area. But the Council do propose to supply railways, canals, docks, or public buildings, which are situated partly in one district and partly in another. That is to say, the Council are looking after the cream of the large business—the supply of those users who require the largest volume of current under contract. The Council, however, are to be allowed to go into competition with certain bulk supply authorities outside the area of the County of London. A more preposterous and speculative scheme was never proposed. All railways, canals, and such like on which electricity can be used for traction and and other motive purposes, are in the areas of more than one local authority; so "good-bye" to existing undertakings ever getting the advantage of that class of supply for themselves and their consumers. Loopholes in plenty are to be left for the Council. The scheme is undoubtedly intended to be the beginning of the end; and the end is the constituting of the Council the sole electricity generators for London—just as in the case of the Administrative Company's scheme last year. No more plant extensions at the stations of the existing undertakers, for all are to be enabled to purchase their requirements wholesale from the Council to meet the demand beyond present capacity. In order that consumers may get the benefit of the cheap electricity that the Council may deliver, the Council are to be clothed with power to appeal to the Board of Trade for the revision, if necessary, of the prices charged by authorized distributors. There are no prices mentioned in the Bill; and no proposal for the revision of the prices charged by the Council themselves. All others are to be subject to control; but not the Council. They are to be a power unto themselves; for if the speech of Counsel and the evidence adduced on behalf of the Council is to be credited, their principal *rôle* in this matter will be the scattering of showers of blessings among those who are authorized at the present time to supply, and therefore, the object being a beneficial one, regulation is not needed. Lookers-on have very good reason for believing that future deeds will hardly be representative of present words.

When we come to the consideration of the grounds on which the Council believe they will be able to supply cheaply the existing undertakers and other people with whom they may desire to do business, we are reminded of the exhibition of incongruity on the part of the Council last year on the Administrative Company's Bill. On the one hand, they asserted that it was not within the power of the Administrative Company to generate at anything like the low costs suggested; and then at a bound they cleared from that position, and declared they could furnish electrical energy as cheaply as the Administrative Company estimated. This is the same inconsistent County Council who are now having preference from the new Government. Where their Bill differs from the Administrative Company's is that there are no definite prices mentioned for supply in bulk or power; and it is only "expected" that by 1911—by which year the Council's prophets predict the scheme will have been fully developed, and when it is thought the demand will have reached 390 million units—the six-hour user will be able to get his supply at 0·81d. per unit, while the eight-hour user will obtain his for 0·67d. The popular mistake was made last year that similar prices to these were going to be the charges to the ordinary consumer; but the engagements entered into by the Administrative Company during the proceedings in Parliament dissipated this error. Another point bearing on the question of price is that, owing to the distances of delivering current to the outside districts from Greenwich and Battersea, those distributors and users within the Administrative County of London will have to pay more on that account, as differential rates, in view of competition with the bulk supply undertakings outside, would not suit the Council's book.

The only commendable feature about the Council's Bill is that they propose to proceed by what are, for so large a scheme, easy steps; and the estimated capital expenditure of £2,370,187 will be spread over the next five years or so, and will, it is calculated, suffice up to 1913 or 1914. All the same, it is speculation with public money. The idea of the Council is to first develop their Greenwich generating-station, and then construct an entirely new one at Battersea. The present invested capital in electricity supply undertakings in London is 18½ millions, of which the Local Authorities are responsible for 6½ millions. These are big figures; and yet the Council are confident that by their scheme they will be able, in comparison with the undertakings represented by these millions, to considerably reduce the capital cost per kilowatt of production. The present average capital expenditure of the Local Authorities is £42 per kilowatt, and of the Companies £51, excluding distribution plant. The computed capital expenditure

for generating plant by the Council, when their scheme is completed, is put at £15 per kilowatt, or including distribution £30 per kilowatt. These latter figures, of course, have nothing concrete about them; and they do not refer to the immediate future. When they are considered, it must be remembered too that they allude to the supply in great volume through trunk cables, and do not embrace the costly distribution network that the existing undertakings have to provide for their businesses. The scheme that is going to work such wonders apparently had its foundation laid by Mr. John H. Rider, the Electrical Engineer to the Council's Tramways Department, and has been elaborated by Sir W. Preece, Mr. Robert Hammond, and Mr. J. F. C. Snell.

The three London Gas Companies and several of the Suburban Companies are opposing the Bill; and they have very good grounds for doing so. Looking at the last issue of "Field's Analysis," it is seen that the Gaslight and Coke Company were in 1904 paying, in the shape of rates and taxes, 3·29d. per 1000 cubic feet of gas sold; and the other two Companies not far short of 2d. That is what the gas consumers have to pay in addition to their own rates. They have therefore a perfect right to view with apprehension any scheme of a speculative character emanating from an authority who have the power, in the event of there being loss, to fall upon the ratepayers for the wherewithal to counterbalance that loss. There is, too, the second injury to the Gas Companies, in that the business which produces the loss is one in competition with them. There is all the difference in the world between one private company competing against another (who are bound if they want to make a dividend to maintain their prices on a profit-yielding basis) and a private company being subject to the competition of a concern run by a public authority, with power to recoup losses at the expense of the ratepayers. Then, again, the authority being in competition with the gas companies and not the ordinary ratepayers, the loss produced falls unequally. It is clear, too, that the more electricity suppliers there are introduced into London, each curtailing the scope for business of the others, the smaller is the likelihood of all being pecuniarily successful. There is talk of the Gas Companies participating in the profits if any are made. If the Companies could by so doing avoid in perpetuity their share in the financial risks of this most nebulous undertaking, they would without hesitation forfeit all right to prospective "profits."

ELECTRIC LIGHTING MEMORANDA.

Bristol Profits, Power Business, and Ratepayers—The Power Consumer and Capital Expenditure—Unfulfilled Predictions at Cheltenham, Worcester, and Faversham—The Sale of Municipal Undertakings Proposed.

THE electricity department of the Bristol Corporation is never long free from the attention of critics. It is one of the municipal undertakings that is conducted in a manner showing a profit; but it is an undertaking which lends itself readily to the proof that the profit is made at the expense of the ratepayers. In other words, if the concern were dependent upon ordinary business, net profit would be a *minus* quantity; but it is made to look prosperous by a heavy charge upon the ratepayers for public lighting and for the lighting of the public offices and buildings. Putting the private lighting consumers and the power users on one side, and the public lamps and buildings using electricity on the other, it is found that the average prices per unit come out about the same—that is to say, taking the figures for the year ending March, 1905, for private supply, an average of 2·99d. per unit is the charge; and for public supply, it is 2·84d. The total costs, exclusive of sinking fund and interest, are placed in the analysis at 1·38d. Now comparing the average charges for private and public supply, it is seen how much the charges levied upon the ratepayers generally must contribute to the easing of the prices charged to private consumers. The beneficiaries will be found by carrying the investigation further. Asking the Council the other day to give the Electric Lighting Committee power to borrow an additional £103,554, Alderman Pearson referred to the price having been reduced from 5d. to 4½d. per unit for private lighting; so that if the average price for private consumption in 1904-5 was 2·99d. per unit, it is pretty evident that the power consumers are getting their electricity at below what is being charged the ratepayers for the current consumed for public purposes. In fact, reference to common sources of information shows that 1½d. per unit is the charge for power. Therefore there are electricity consumers in Bristol whose expenses for power are lightened to the disadvantage of the ratepayers generally.

Under these circumstances, what Alderman Pearson reports is just what one would expect—that the private lighting consumers have not increased at the rate anticipated, but the highly privileged class using current for motive power is on the increase. And it may also be conjectured that Bristol could confirm the experience of the Urban Electric Supply Company, Limited, whose Chairman recently stated that "the past year has been a bad one for electrical companies, consumers now learning how to economize." But the increase of the power branch of the business at Bristol is one on which the ratepayers do not appear to be sufficiently informed, and we will refer to it again directly. Another point is the growth of the capital expenditure. Alderman Pearson periodically appears in the Council with a request for additional capital. He preferred such a request, and obtained what he wanted, two years ago; and he was asking the other day for the already-mentioned £103,554. The Alderman is well up in the technics of the electrical industry; and it is wonderful what a silencing effect speaking in terms of kilowatts and so on has upon those members who are itching to criticize, but are afraid of making too manifest their nomenclatural ignorance. With a glib-tongued Chairman, these (to the layman) strange expressions are a great advantage to the electrical industry in connection with municipal affairs. Alderman Pearson, at all events, so it is hinted, has learned what an effectual aid to the smoothness of his Chairmanship is his knowledge of technical terms; and so when he wants more money he springs them on his fellow-members. He always gets what he asks for.

But in connection with the question of price previously referred to, there is a matter to which consideration should be given by the ratepayers. Alderman Pearson has distinctly indicated that the greater part of the capital expenditure to be incurred in the near future is required for the motive power business; and the ratepayers should remark that this is the special branch of the business that is least profitable, and which they support through their compulsory patronage, at a higher price, of the Electricity Department for street and public building lighting. The amount of money that is required for sinking fund and interest, Alderman Pearson states, is on the increase; and at the rate capital expenditure is going on, the amount will not stop growing. But the direction from which the greatest increase of business is now coming, and for which the new capital outlay is chiefly needed, is the one which will produce a reduced yield of gross profit per unit of the output; and supervening is the prediction that soon larger units of plant and larger stations will soon be necessary. A very close inspection should be made of these matters, to see that the concern in the future will be able to produce, without drawing so much as at present from the pockets of the ratepayers, sufficient to bear all the charges that this warning as to a great increase of capital expenditure forecasts. Criticism in the past has been mainly directed to the question as to whether sufficient has been put by by the Committee for sinking fund, reserve, and depreciation; and Professor Dixie, who has been consulted by the Electricity Committee, has fortified them by stating that they are putting aside rather more than would be necessary if the concern were an ordinary company. What he means by this is not plain; seeing that there is no comparison between a company with a privately subscribed capital, and a municipal concern run entirely upon borrowed money, which has to be repaid. An ordinary company with capital privately provided, have not the liabilities to meet that the municipal body must have; and any inadequate financial policy would produce a reflux which would damage not the general body of ratepayers, but the private capitalists. It does not appear that the Electricity Committee intend to publish Professor Dixie's report *in extenso*.

This same question of the power consumer and capital expenditure has cropped up at Coventry; but there again the Corporation and the ratepayers apparently do not realize the difference between the business of the past and this new business, in relation to capital expenditure. The Electric Lighting Committee some weeks ago came before the Council with a proposal to carry out electric lighting works' extensions at a cost of £35,000; and it was then negatived—the Council demanding more information. At the succeeding meeting, the proposal was reintroduced, and adopted, though the arguments were not a whit the better, except that the Chairman informed the Council that, following their former meeting, there had been applications for "200 horse power motors." Now the 200 horse power motors, without a hyphen between the 200 and the horse, may look a lot to the lay mind—more so than would have been such a statement of the fact as "applications for motors aggregating 200-horse power." It appears to be to power supply that the Committee are chiefly looking for custom. If this is so, inasmuch as a low price is charged for this class of supply (Alderman Andrews says that he has no doubt a large part of the current is sold for less than cost price), it is illogical for a supporter of the recommendation to expend the £35,000 on extensions to say "*if* they could make a 'profit' of £2000 on their present output, they could make a great profit when they nearly doubled their output." The profit so far does not appear to have been much, seeing that Alderman Lee stated in the discussion that "the Corporation had sunk £150,000 in this concern, and not a penny had been handed back in relief of the rates." In 1904-5, there was a deficit of £228. If the output is nearly doubled, largely on that part of the electricity supplied at what Alderman Andrews called "less than cost price," we fail to see where the prophesied "great profit" is coming from. According to the analysis of the accounts for 1905, the average price obtained for private supply was 2·13d., and for public purposes 2·55d.! How the ratepayers can be contented with this condition of things, we do not know. Light is being let into the question of the effect of an electricity day-load at below the average cost; and the future will strengthen that light.

Lucky are many of the towns that, having become enamoured of electricity, and obtained powers of supply, allowed time to cool their passion to such degree that they could without a single pang hand over their powers to a private company; for they have now the pleasure of being the critics instead of the criticized, and they have not the worry of perpetually scheming to hide from the ratepayers the financial instability of an undertaking. In the past, and in several places, dissatisfaction with the results of

undertakings has led to suggestions being made that the Local Authorities should, if possible, find buyers for the concerns; but that is more than the pride of the bulk of the members of municipalities can brook. The Cheltenham works are now mentioned as suitable ones for sale. The ratepayers we expect would be only too glad if they could see the whole of their capital and losses back again in connection with this undertaking. It has been a poor thing right away from the beginning; and nothing seems capable of lifting it into a better financial state. March, 1905, saw the end of the ninth year of working; and there was then a surplus of £293, after meeting interest and sinking fund. There is no necessity on this occasion to inquire too closely as to whether this is a well-founded surplus, nor as to the amount of the ratepayers' contribution to the finances of the undertaking through the public lighting. But the fact remains that although the works are larger, the number of consumers greater, and the consumption largely developed, the undertaking financially is not in a better, but perhaps (if the whole truth were known) in rather a worse, position than two or three years after it started operations. Looking back at the history of the concern, at the beginning it was estimated there would be "a loss the first year or two;" and then it is found that, at a Local Government Board inquiry, after the works had had their first year's run, it was anticipated that, at the end of the second year's working, the receipts would meet not only working expenses but the whole of the capital charges. Again it was publicly stated in 1897 that, for the year ending March, 1898, it was expected that, after paying interest on loans and allowing for depreciation and sinking fund, there would be a surplus of £300 to £600. The surplus for the year ending March, 1905, as shown, was less even than the £300. The works have put a heavy responsibility on the town, have given a great deal of worry in respect of their management, and have wasted the ratepayers' money in street lighting, at the inauguration of which the success of the undertaking, so it is written in its history, was pledged in champagne. That champagne was undoubtedly wasted; for the undertaking has most certainly got no forwarder in financial success.

Rumour has got somehow abroad that offers have been made to purchase the undertaking, and the Chairman of the Lighting Committee has been congratulated on the prospective sale; but he denies that anything of the kind has come before his Committee. It is to come, however, because Mr. Stroud has given notice of a motion in the Council that it is desirable, in the interests of the general body of ratepayers, to consider the advisability of selling the electricity undertaking to some person or company "upon terms that shall reimburse the borough the full amount of the capital moneys incurred in the said undertaking up to the present time, and also to safeguard the nature and price of supply both for public and private lighting—thereby obviating further capital expenditure by the Council, and the possible risks and disadvantages attendant upon the management and control of the undertaking."

It is an indication of a growing disgust when such proposals are made in three places almost simultaneously. Precisely the same thing has happened at Worcester and Faversham—resolutions proposing sale having been debated. For twelve years the Worcester City Council have wrestled with their undertaking; but it has only gone from bad to worse. They are now going to remove the plant from the ill-fated Powick works to the Hylton Road generating-station; and the undischarged expenditure on the old plant that is only fit for the scrap-heap is to be placed to a suspense account. There is loss here to be wiped out. Then dissatisfaction of the consumers has led to a flat-rate of charge being adopted as an alternative to the maximum demand system; and this change, it is estimated, will mean a loss of £441. The works are already enormously over-capitalized; and more money still is to be expended. The cost of the public lighting is now £1375 more than before the electric light was introduced—the payment in 1905 for 947 gas-lamps being £2894, and for 140 electric lamps £1711. The rates have also contributed heavily to the support of the undertaking. But the Council prefer to stick to their old, storm-beaten ship. At Faversham, Alderman Child has called attention to the "heavy burden" put upon the ratepayers for the maintenance of the electric light works, and has proposed that the Town Clerk should ascertain the powers of the Council to dispose of the works, plant, &c., and inquire of the engineers whether a sale could be effected at a price that would recoup the Council what they have spent. The motion was lost, but it is indicative of dissatisfaction with the burden. Through the ravines of the past seems to come a mocking echo of the inaugural cheers that were once heard at Cheltenham, Worcester and Faversham.

Bearing upon the same question, the Municipal Association of Bermondsey have suggested to the Borough Council that the best thing they can do with their electricity undertaking is to part with it. The Tynemouth Corporation are actually offering for sale a new generating set, because they find they can do better by taking a supply in bulk from the Newcastle-on-Tyne Electricity Supply Company. The Whitehaven Town Council have come to terms with the Cumberland Electricity and Power Gas Company, whereby the latter will take over (at the price of £25,000) the municipal electricity undertaking, within three years from March, 1907, on the Bill that the Company have in Parliament receiving the Royal Assent. These are most assuredly all significant facts.

VALUE OF METALLURGY IN ENGINEERING.

Our readers are aware that one of the features of the year's proceedings of the Institution of Civil Engineers is the delivery of the lecture instituted to commemorate the name of Mr. James Forrest, who for a long time filled the position of Secretary to the Institution, and who is still associated with it in the capacity of Honorary Secretary. The fourteenth lecture of the series was delivered on the 2nd inst. by Mr. Robert Abbott Hadfield, who took for his subject "Unsolved Problems in Metallurgy." The lecture was not framed on the orthodox lines of those preceding it, for it was considerably shorter than usual; and after a much abbreviated reading of it, the members repaired to the reading-room, where there was an interesting exhibition of apparatus used in metallurgical research, and where various tests were carried out. The author rightly thought that, by making these actual demonstrations, individual knowledge would be imparted to a greater extent than by the delivery of a long lecture.

The exhibits were divided into nine classes, the first, and also one of the most attractive, relating to the literature of the subject, which ranged from the Fifteenth Century to the present time; the earliest work, we believe, being Albert Magni's "Meteor," written on parchment and bound in wood, dating from 1475. But in the course of his lecture, Mr. Hadfield quoted a much more ancient piece of writing from "Ecclesiasticus" (XXXVIII. 28), the date of which is probably about 200 B.C. The working of iron in its simplest form is thus described: "The smith also sitting by the anvil and considering the ironwork, the vapour of the fire wasteth his flesh, and he fighteth with the heat of the furnace: the noise of the hammer and the anvil is ever in his ears, and his eyes look still upon the pattern of the thing that he maketh; he setteth his mind to finish his work, and watcheth to polish it perfectly." Mr. Hadfield referred in this connection to the beautiful inlaid iron and steel work done in Russia, several examples of which were exhibited. Some fragments of ingots made by Huntsman before the year 1800 were also shown. Samples of special steels and alloys were exhibited, and a variety of chemical laboratory apparatus, such as that for determining the sulphur in iron or steel. Experiments showing the sharply defined hardening temperature of steel were carried out; and different types of pyrometers, both electrical and optical, were on view. With reference to the subject of pyrometry, Mr. Hadfield, in the course of his lecture, referred to the immense strides that have been made in this branch of science during the last decade. "It is but a few years ago," he said, "that any correct determination of high temperatures became possible. Chaos is the only word suitable to the conditions previously existing. Misleading data only increased the confusion. Now, by means of the modern pyrometer, temperatures up to 1100° or 1200° C. can be determined within a few degrees; in fact, Callendar claims that by his research instrument it is possible to indicate within one-tenth of one degree centigrade." Liquid air was also in evidence, and experiments were conducted to show its effect on the properties of metals at a temperature of −182° C., and also its embrittling effect upon iron and steel. That such investigations are not without their practical bearing is shown by the physical facts that have been brought to light by them, and their assistance in elucidating the cause of the breakage of a steel rail recently, which had been in service in a cold country. At the temperature of liquid air, the purest and toughest wrought iron becomes as brittle as hardened steel, and is quite easily broken.

Turning to the lecture itself, and in particular to those portions of it which are likely to be of interest to the gas engineer, Mr. Hadfield made some introductory remarks on the subject of research generally, and strongly commended to students the perusal of Gore's "Art of Scientific Discovery." No field of scientific inquiry has ever been exhausted. The investigator should be free from bias in favour of old views, and open-minded for the reception of new ones. The value of the world's products of iron and steel is now not far short of £1,000,000,000 annually. The output of pig iron for 1905 was 53,000,000 tons, or double that of fifteen years ago, and of this amount probably 80 per cent. is turned into steel. The United Kingdom still holds the field in having produced the largest cumulative quantity of iron, and also yet exports more than any other nation—twice as much as the United States, and nearly 50 per cent. more than Germany.

Coming to the question of composition, the chief characteristics of iron are: Malleability, tenacity, ductility, elasticity, hardness, permeability, conductivity, resistivity, and fusion-point. The presence of 0·20 per cent. of sulphur, or even less, completely destroys the malleability of iron when hot. The fusion-point of cast iron is lowered several hundred degrees by the presence of carbon and other elements. The elastic limit of pure iron is about 10 tons per square inch; but this is increased to over 100 tons in nickel-chromium steel. All the remarkable variations in quality can, generally speaking, be ascribed to differences in crystallization, which is affected by the particular kind of heat treatment and cooling to which the metal is subjected. As a rule, the larger the granular structure, the weaker and the more brittle is the product. This is less important in the softer steels (*i.e.*, those in which the percentage of carbon is lower); but in higher carbon steel, large granular structure is fatal to its quality. Thus we see that the whole art of producing steel of high quality consists in controlling the crystallization required. This in turn

depends upon checking the temperature; and this is now quite possible, thanks to modern pyrometers. A variation of 1° C. will cause considerable difference in physical qualities. Take ordinary carbon steel, of tool quality, of the following composition: Carbon, 1·16 per cent.; silicon, 0·07 per cent.; manganese, 0·37 per cent. When heated to 725° C., it will afterwards bend cold to 43°; but if heated to 740° C.—an increase of only 15° C. (27° Fahr.)—the bend is *nil*, and it is completely hardened. This is no more than the change in temperature between a spring and a summer day, yet the structure of the steel is revolutionized. Curiously enough, however, the alloy of iron and manganese (with which Mr. Hadfield's name is so intimately associated, and which has been used in connection with hot-coke conveyors), is not affected by any change in temperature, from the highest to that of liquid air.

In testings of various kinds, the civil engineer is largely interested. He wants to know how the material will withstand shocks, wear and tear, and atmospheric influence. The metallurgist does his best to meet the special demands made upon him. Mr. Hadfield says "Bessemer's first rails were laughed at; yet to-day statistics tell us there are 525,000 miles of single track of railway in the world, or a total length of considerably over 1,000,000 miles of rails. This means that there is a total of about 71,676,000 tons of rails in use at the present time, most of them made by the Bessemer process." Mr. Hadfield then goes on to address a word to the civil or mechanical engineer; and we venture to think that his remarks may also be applied to the gas engineer as well. "Be patient with the metallurgist [and we would add the contractor]; give him a helping hand. When designing your machines, or drawing up your specifications, call him into your councils, and you will assist him to meet your requirements, thus benefiting yourself."

To return to tests, new types of them are springing up, approximating to those of actual service—vibratory, alternating, shock, bending, and shearing. Machines are now obtainable for making these tests. They prove that it is not safe to rest content with the ordinary static tests; and an experiment was made to show this. A sample of mild steel of best quality was obtained of the following percentage composition: Carbon, 0·12; silicon, 0·02; sulphur, 0·15; phosphorus, 0·15; manganese, 0·28. This had an elastic limit of 16 tons per square inch, a tenacity of 28 tons per square inch, an elongation of 35 per cent., and a reduction in area of 65 per cent. It bent double cold under the notch test. Another portion of the same steel, which was heated to 1200° C. and cooled slowly, gave the following results: Elastic limit, 9 tons per square inch; tenacity, 22 tons per square inch; elongation, 46 per cent.; reduction in area, 64 per cent. It might have been thought that with this increase in elongation, to the high figure of 46 per cent., the material would be in a still better condition than the original specimen. Strange to say, however, under the dynamic shock or notch test, it snapped like cast iron. Not only this, but a test-piece from the same material not nicked bent double cold under shock. Mr. Hadfield comments on this most curious result, that it "shows how careful users of steel should be in its heat treatment, as without doubt brittleness can be developed under certain conditions at much lower temperatures than the one above mentioned. It is also clearly seen that the existence of the bad qualities, brittleness and low resistance to shock tests, are not shown by the use of ordinary tensile tests." This may be of use and importance to engineers in preparing specification tests to be applied to new constructional work.

Financial Transactions of Local Authorities.—Last Thursday, the House of Commons ordered, on the motion of Mr. Claude Hay, a return showing for London, for England and Wales excluding London, and for the two together, the approximate number of the local authorities who had financial transactions during the year 1904-5, and the number of such authorities whose accounts are subject to audit by District Auditors; also showing, in the case of the last-mentioned authorities, whether the accounts are audited yearly or half yearly.

Coal Production and Export Last Year.—In answer to a question put by Mr. Hicks Beach on Monday last week, the President of the Board of Trade (Mr. Lloyd-George) stated that the total quantity of coal produced in the United Kingdom in the past year was 236,128,936 tons. The total quantity exported, including the estimated coal equivalent of the exports of coke and patent fuel, was 49,764,500 tons; or if coal used for bunkering steamers engaged in foreign trade were included, 67,160,646 tons. The proportion of exports to production accordingly amounted to 21·1 per cent. or 28·4 per cent., according as bunker coal was excluded or included.

Southern District Association of Gas Engineers and Managers.—We are informed by the Hon. Secretary (Mr. A. F. Browne) that the summer meeting of the Association will be held on Thursday, the 24th inst. The members will assemble at Hoe Street Station, Walthamstow, and then proceed to the electricity generating station of the Urban District Council, where Westinghouse engines are operated with Dowson gas plant. The party will then drive to the gas-works to luncheon, on the invitation of the Chairman and Directors of the Lea Bridge District Gas Company. After lunch, the works will be inspected; and then the members will drive to the Royal Oak Hotel, High Beech, Epping Forest, where tea will be served.

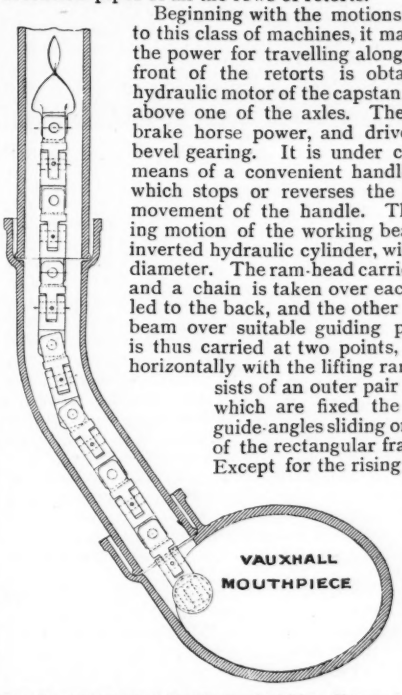
TREWBY-BIGGART PIPE-CLEANING MACHINE.

THE laborious and fatiguing work associated with the clearing of ascension-pipes by hand, has led to many attempts being made in the past to produce a machine for the purpose; but until the one which we are about to describe was designed, there had been no real success.

The first of these machines was made for the Beckton works of the Gaslight and Coke Company, where it was set to work; and though there were some little preliminary difficulties, it has all along accomplished the work successfully. Various improvements and suggestions have been made by the engineering staff at the Gaslight and Coke Company's works, and at the Vauxhall works of the South Metropolitan Gas Company. These have been embodied in the machine illustrated which is now in operation at the latter works.

The requirements of the work may be summed up under the following heads: (1) The racking of the auger carrier or guide forward into position. (2) Adjusting the auger carrier or guide, after being racked forward, to the mouthpiece of the ascension-pipe at its junction with the retort. (3) The insertion of the flexible auger a sufficient distance up the ascension-pipe. (4) The revolving of this auger during the insertion, so as to make it act as a boring or cutting tool for the purpose of removing the deposited material inside the ascension-pipe. (5) Its withdrawal for the purpose of clearing the deposit.

The body of the machine is simply a rectangular framework of plates and angles, carried on axle brackets of cast steel, and of such a height as to admit of the working beam operating on the ascension-pipes of all the rows of retorts.

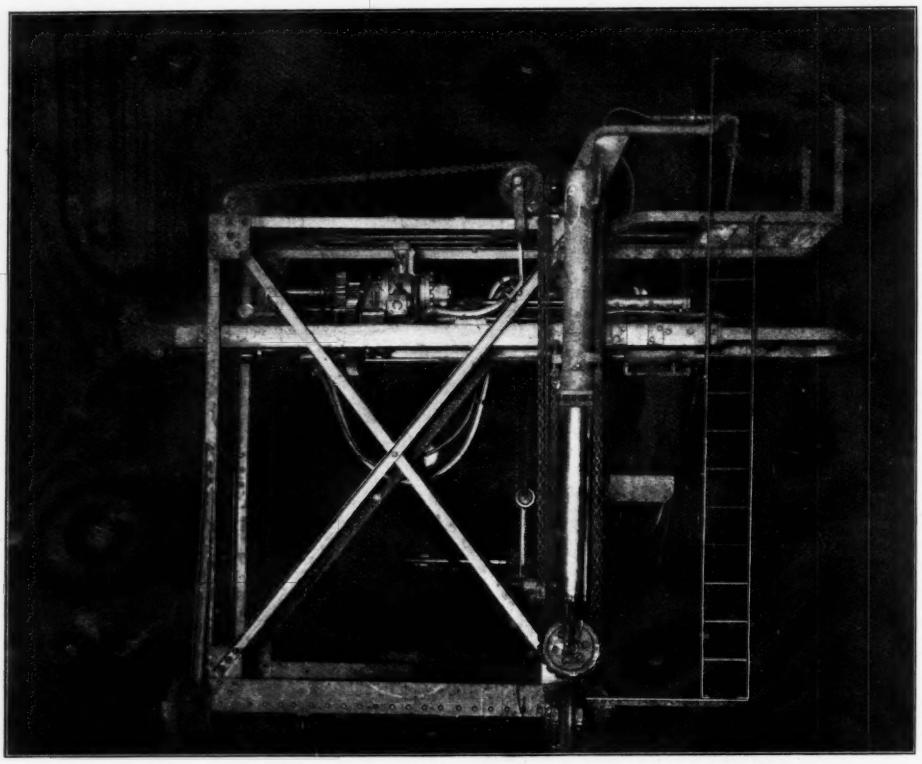


The Flexible Shaft of the Mechanical Pipe-Cleaner.

Beginning with the motions which are common to this class of machines, it may be mentioned that the power for travelling along the retort-house in front of the retorts is obtained from a small hydraulic motor of the capstan type, placed directly above one of the axles. The motor develops 1½ brake horse power, and drives the axle through bevel gearing. It is under complete control by means of a convenient handle and patent valve, which stops or reverses the motion by a slight movement of the handle. The lifting and lowering motion of the working beam is secured by an inverted hydraulic cylinder, with a ram of 6 inches diameter. The ram-head carries two chain pulleys, and a chain is taken over each pulley; one being led to the back, and the other to the front, of the beam over suitable guiding pulleys. The beam is thus carried at two points, and rises and falls horizontally with the lifting ram. The beam consists of an outer pair of steel channels, to which are fixed the lifting chains and guide-angles sliding on the vertical angles of the rectangular frame of the machine. Except for the rising and falling motion, this portion of the beam is stationary; and to it is fixed a small hydraulic cylinder, with a stroke of about 2 feet, for racking an inner beam carrying the whole revolving gear, shaft, and auger head. The inner beam consists of a pair of steel channels, which rest on the planed inside surface of the bottom flange of the outer pair of channels; and on it are mounted the cylinder for inserting and withdrawing the auger head, the racking fixture, the hydraulic motor and gearing for the revolving shaft and auger carrier or guide. The various parts are carried on brackets, which, in turn, bind the side channels together, and give stiffness and rigidity to the whole.

The hydraulic motor for revolving the auger develops 4 brake horse power, and drives a shaft on which are three spur pinions, any one of which, when working, is in gear with the corresponding wheel keyed to a sleeve, carried on journals from the inner channels. The set of pinions are moved along the motor shaft, and the different pinions gearing with their respective wheels cause the revolver shaft to rotate at three different speeds, if advisable owing to the great difference of conditions that obtain in the pipes. In some cases, the tarry deposits have become hard and rock like; in other cases, stiff and gluish, and in others they are softer and easily cleaned. These take more or less power; and it is found that better results are obtained by running the auger head slowly but with more power, in some cases, and in others by running the auger head quickly but with less power. The changing of the speeds is simply and easily made; and the necessity for making a change generally depends on the interval of time that has elapsed since the pipes were last cleaned.

The sleeve before referred to, on which the driving spur-wheels are keyed, is bored out to receive the revolving shaft, and is keyed to it by a sliding feather. When the sleeve is then made to re-



The Trewby-Biggart Pipe-Cleaning Machine.

volve by the spur-wheels, the shaft inside the sleeve also revolves, and the sliding key at the same time permits of an end-wise movement being given to the shaft. This is given by the push-up cylinder, which is placed directly at the back of, and in line with, the revolving shaft; the piston being connected to the end of the shaft by a suitable connection, with anti-friction thrust washers. To the front end of the revolving shaft, a special flexible shaft with a cutting augur at the front is fixed. The flexible shaft was the subject of many experiments before success was attained. A wire rope was first suggested and tried; but in experiments on a model ascension-pipe, a jointed flexible shaft seemed to promise more success. Another shaft made of toothed ferrules strung on a stretched wire rope, and with balls and sockets between each to take the thrust, was tried with a fair measure of success. The shaft was very flexible. It did the work well. But tarry matter was apt to fill up the space between the teeth; and this required frequent cleaning and renewal.

The shaft which is now used is shown by the drawing, and consists of a series of simple joints fixed to the revolving shaft and terminating in the boring auger. This is practically the same as one of the early models tried at the Dalmarnock Iron-Works; and it gives little or no trouble. The auger head is guided to the ascension-pipe by the carrier or guide—a casting which is carried in the journals of the inner beam, and is perforated with holes to allow the scrapings of the pipes to fall clear. A projection on the auger carrier acts as a stop; and the downward thrust of the auger and shaft is taken on two rollers. All the motions are independent of each other, and are actuated by separate cocks. All working handles are brought to a point convenient to the man who stands on a platform at the back of the machine.

It is generally found that the tarry deposits are near the bottom end of the ascension-pipes; and the insertion of the auger a few feet up the pipes is sufficient to keep them clean.

As to the working of the machine. The practice at the Vauxhall Gas-Works is to clear all the pipes systematically every shift, though this is not necessary in all works. When working in conjunction with a drawing and a charging machine, the pipe cleaner can easily keep ahead. The machine at Vauxhall is now clearing 52 pipes within the hour.

The machine is the joint invention of Mr. G. C. Trewby, late Chief Engineer of the Gaslight and Coke Company, and Mr. A. S. Biggart, of Sir William Arrol and Co., Limited, of Glasgow.

The first *conversazione* of the Royal Society for the present season was held on Wednesday in the rooms in Burlington House; the guests being received by Lord Rayleigh, O.M., the President, who, as our readers are aware, is the Chief Gas Examiner for the Metropolis. Among the exhibits, which were of the highest scientific interest, were the gas calorimeter designed by Mr. C. V. Boys, which was described in the "JOURNAL" early in the year; and a collection of rare minerals from Ceylon, including thorium, shown by Professor Wyndham Dunstan, of the Imperial Institute.

PRESERVATIVE PAINT FOR IRON AND CEMENT.

A New German Preparation.

IN a recent issue of the "Journal für Gasbeleuchtung," Dr. K. Roth, of Frankfort-on-the-Main, calls attention to the merits claimed on behalf of a new preparation he has invented for the protection of iron and cement surfaces which are exposed to the action of water.

In the first part of his article, the author enumerates the qualities that a good preservative paint should possess. If intended for application to cement, the composition must be capable of withstanding the attack of carbonic acid and of dissolved oxygen. Suitably prepared products made from coal, brown coal, and gas-oil tar, from asphaltum, and from similar materials, answer the first requirement; but purely mineral bodies, resinates, "siccatives," casein compositions, and other organic substances, are essentially valueless. Linseed oil preparations and unsuitably selected tarry preparations are unable to resist the action of oxygen. A paint for cement must also be permanent in the presence of micro-organisms and of their metabolized products. It must, therefore, be aseptic or sterile. It must possess good adhesive power, and not become brittle. Paint of any kind will not behave satisfactorily upon cement if applied before the latter has thoroughly set and hardened. The cement, indeed, should have been well saturated with water before the paint is put on.

Paints for application to iron must exhibit the same properties in an enhanced degree. But the quality of elasticity is more important than in the former case. A protective paint cannot "destroy" rust; for any material which attacks iron rust must attack the metal itself. A paint for iron must also insulate the metal electrically; as otherwise it may encourage electrolytic action between the iron and the soil, under the influence of the water and the salts in the neighbourhood.

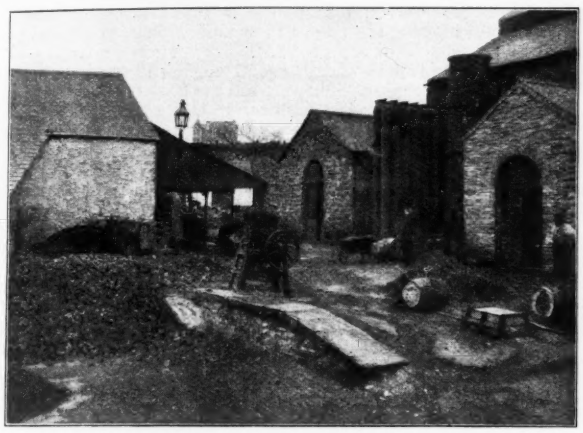
The preservative composition which the author is desirous of advocating is termed "Inertol;" and it is made by Paul Lechler, of Stuttgart. No details as to its constitution are given; but it is claimed to possess the several desirable qualities outlined above. According to a report signed by Herr Kölle, an official of the Frankfurt Water-Works, "Inertol" was used in competition with numerous other (unnamed) preparations for painting the cement plastering of an elevated reservoir, and for certain parts of the iron water-mains in the city during the year 1903. Writing seven months after the institution of the tests, Herr Kölle reported that the "Inertol" was still in perfect condition while the other materials were all more or less injured. Writing again in 1905, after an experience lasting for 17 months in some cases and 31 months in others, Herr Kölle stated that the material had acted more efficiently than any other examined, both on cement and on iron; and that it was particularly to be recommended for application to cast and wrought ironwork.

TAVISTOCK AND ITS NEW GAS-WORKS.

Invitations have been issued by the Directors of Willey and Co., Limited, of Exeter, for the inauguration of the new gas-works which they have just completed for the Tavistock Gas Company; and we are enabled to-day to give some particulars and a few photos of the new arrangement of plant.

The works, which will be opened to-morrow (Wednesday), have been designed by Mr. J. W. Buckley, Assoc.M.Inst.C.E., of Devonport; and on his formally handing them over to the Directors of the Company, the Chairman (Mr. H. T. Doble) will open the valve connecting the new gasholder with the town, and thereafter—with a specially invited party of guests—will inspect the plant. Afterwards, by invitation of the Contractors, there will be a luncheon at the Bedford Hotel.

Messrs. Willey and Co. have sent the following interesting account of their work—prefacing it with a brief reference to the early days of gas lighting in the town.



A View of the Old Gas-Works.

In the year 1831, the residents, in common with those of other towns, met under the chairmanship of Mr. J. Rundle, a local banker, and as the result a Gas Company was formed, with the modest capital of £1500, to supply the town with gas at 7s. 6d. per 1000 cubic feet. It continued to do so up to 1845, when the gas-works were enlarged; the share capital being then increased to £2250. In 1853, for the purchase of a new gasholder, the capital was still further increased, by the issue of more shares, to £2550. In 1857, the Company was incorporated, under the Joint-Stock Companies Act of 1856, with a capital, in 800 shares, of £5000, of £6 5s. each; but only £3 3s. 9d. per share (£2550) was called up. The Company held its own up to 1874, in which year the present Chairman (Mr. H. T. Doble) was elected a Director. Mr. A. Francis, who has been associated with the Company since the year 1874 (first as a Director), was appointed Manager and Secretary; and his careful management reflects the greatest possible credit upon all concerned.

The Directors have always adhered to their policy of setting aside annually a reserve fund; and, therefore, although the paid-up capital of the Company stood at only £2250 in 1890, a reserve fund amounting to £3490 had then been accumulated. The annual make of gas stood at 13 million cubic feet, and the price at 4s. per 1000 feet. By 1900, the reserve fund had reached £6000, or more than double the total paid-up capital; the annual make being 18 millions, and the price of gas reduced to 3s. 6d.—an achievement of which any company might well be proud. The price of gas, be it noted, during the decade will compare favourably with the average of neighbouring towns, and a steady dividend was paid to the shareholders, in spite of the heavy expenditure out of revenue from time to time on renewals and extensions.

At length, however, the old works became so cramped for want of space and out of date, added to the fact that the lease had expired, that the Directors decided to reconstruct the Company, and abandon the old works entirely. A site was found for the new works near West Bridge; and the new Company—its position strengthened by the obtaining of a Provisional Order and a confirmatory Act of Parliament, and with a capital of £15,000—decided to proceed immediately with the erection of entirely new works, capable of producing about 50 million cubic feet of gas per annum, to the designs and under the superintendence of their Consulting Engineer, Mr. J. W. Buckley. Competitive tenders were invited, and the contracts were eventually placed with Messrs. Willey and Co., for the engineering work, and Mr. W. Brealy, also of Exeter, for the buildings.

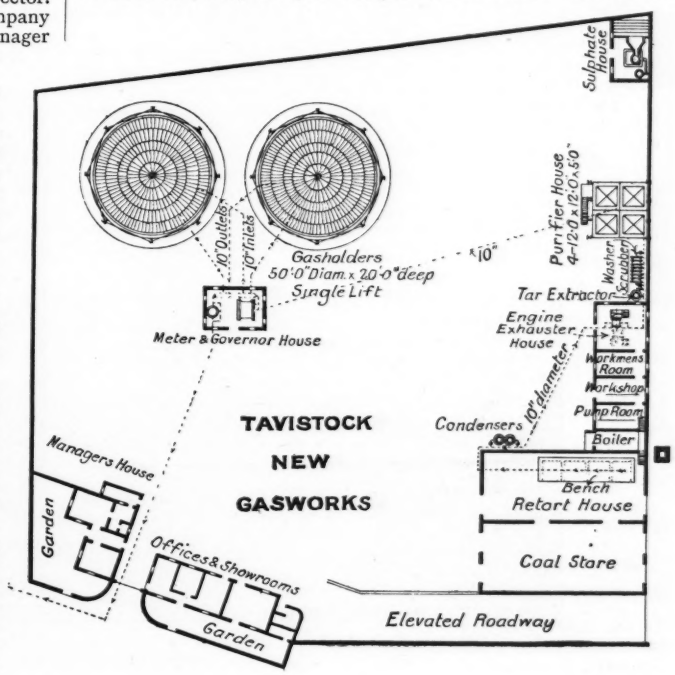
The new works, situated about half-a-mile from the centre of the town, and occupying about 1½ acres, though somewhat distant from the railway, are in all other respects admirably placed. The buildings throughout have been constructed of local stone, relieved at the plinths, coigns, windows, &c., by red and buff brick; and they present a pleasing appearance.

The retort-house and coal-store are of equal size—viz., 70 feet by 30 feet and 20 feet high at the eaves. The former contains at present three settings of six 21 in. by 15 in. Ω retorts, with one additional arch empty, and still allowing room for two further arches to be built when required. The settings are of the regenerator type, with patent tube flues; and they have a guaranteed output of 7300 cubic feet of gas per mouthpiece in 24 hours with a fuel consumption of 14 lbs. per cwt. of coal carbonized. The furnace fittings are of the latest design, with quadrant hydraulic mains and patent hydraulic main valves for flushing purposes and to maintain the liquor seals; the tar and gas being taken away in separate mains. The coal-store has a capacity of 800 tons; and a special elevated roadway has been constructed so that carts may be able to tip the coal through side openings 10 feet above the floor level, and thus save the cost of trimming. The roofs over all the above are of iron and slate. The condensers are annular, 20 feet high, with 3 feet diameter outer and 2 ft. 3 in. diameter inner steel tubes, with handsome top and bottom moulding of cast iron; and they are fitted with special tar take-offs and seal-pots.

Adjoining the retort-house a line of buildings has been erected for the housing of the boilers, pumps, and exhausters, and to serve as a workshop and mess-room for the employees. Ease of access and the comfort of the men have been carefully considered. The boiler-house, which contains a boiler of the Cornish type, and fitted with a forced-draft furnace for burning breeze, &c., adjoins the pump-house, in which there are three direct-driven steam-pumps—one each for tar, liquor, and boiler feed-water purposes. The exhauster-room measures 20 feet square; and in it are fitted a direct-driven steam-engine and exhauster capable of passing 10,000 cubic feet of gas per hour, and comprising the latest improvements. Arrangements have been made for the future erection of another set of apparatus, for which all the connections and floor-plates are already provided. In the same room are fitted two batteries of 24-inch pressure-gauges, to show the pressure in all parts of the works.

Next to this room is fixed a Pelouze and Audouin tar-extractor and a rotary washer-scrubber capable of dealing with 250,000 cubic feet of gas per diem, with all the latest improvements, and enclosed in a neat open-fronted shed with iron slated roof. Immediately in front of this is fixed a liquor and tar storage tank, 20 ft. by 10 ft. underground, built of cast-iron plates, and covered with a roof of steel joists and concrete.

The purifier-house adjoining is an imposing and handsome structure. The framing is built of steel joists and columns, and the roof is of steel and slated. The four purifiers, which are erected overhead, are 12 feet square and 5 feet deep, with steel covers on the luteless principle, and fitted with an improved rubber-joint arrangement. The boxes are to be filled with oxide of iron, and operated by a 12-inch "Pickering" patent valve, made to work one, two, three, or four purifiers at a time. The valve



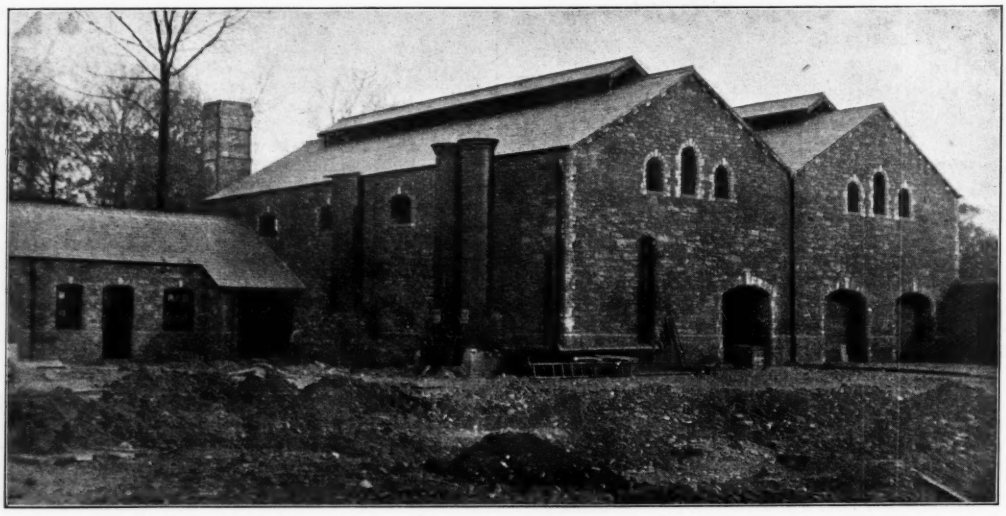
The Manager's House, the Offices, and the Show Rooms.

is attached to the bottom plates on the under side of the boxes, without connections. It is controllable with the greatest ease. The oxide is elevated by means of a swing jib and windlass, and the top of the purifiers is reached by means of a strong steel staircase protected by handrailing, which is continued round the top of the purifiers. The covers are easily lifted by two sets of differential blocks travelling on steel joists. The ground space underneath the purifiers themselves has been concreted over for the storage and revivification of the oxide, and in addition there is a large space at the side.

The sulphate house and plant are placed at the extreme corner of the works, and are a model of compactness. The plant is on the continuous system, with patent still and saturator, and is capable of producing from 10 to 15 cwt. of sulphate per diem.

The two gasholders are erected in steel tanks on the ground level, and are 50 feet in diameter and 20 feet deep; both being prepared for telescoping. They have at the present time a storage capacity of 80,000 cubic feet, with an ultimate capacity of 159,000 cubic feet. The standards are steel joists securely attached to the sides of the tank, and supported by a concrete base; while the girders are of the ordinary lattice kind.

Immediately in front of the gasholders stands the meter and



The New Retort-House and Coal-Store.

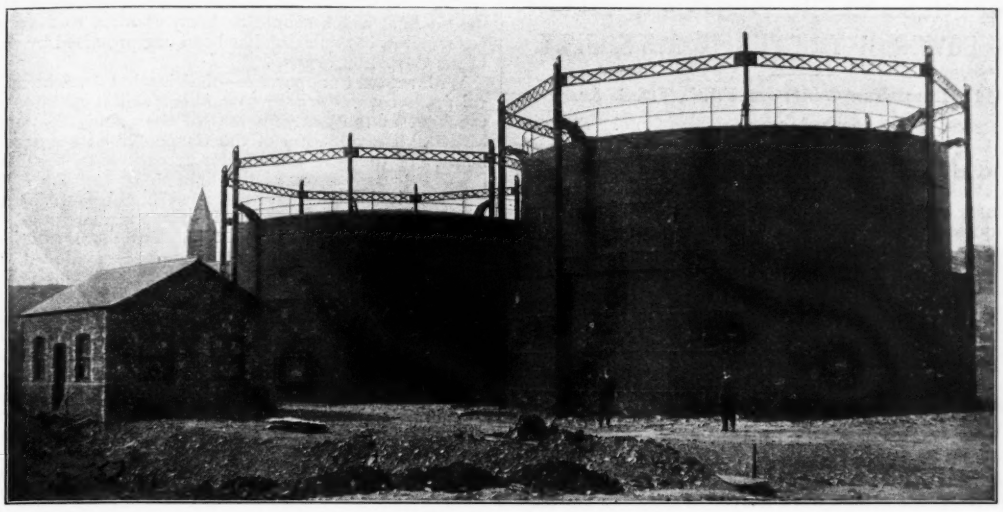
governor house, containing a cylindrical station meter to pass 10,000 cubic feet of gas per hour, fitted with every improvement, including automatic gauge and water overflow, and resting on cast-iron cradles. The governor itself is one of Simpson's patent type, fitted with water-loading arrangement and automatic overflow. In this house there are also two collecting chambers for the inlet and outlet gases; and to them are attached the valves controlling the gasholders. These, as well as those of the governor, are fitted with strong indicator columns. A set of four well-mounted 24-inch pressure-gauges is attached to the wall.

The pipes and connections throughout the works are 10 inches in diameter, with a liberal number of clearing-caps and flanges. The same size of main has also been laid, for about 400 yards, to a point near to the Drake Monument, where the existing gas-mains to the town are connected.

The yard space available at the works is all that could be desired; while the Manager's house, with the offices and show-rooms adjoining, presents a pleasing appearance—being roomy, well-planned, and conveniently arranged.

The whole works are enclosed by a stone boundary wall 8 feet high, and are efficiently drained. They are exceptionally well designed and built; and no doubt they will be looked upon with

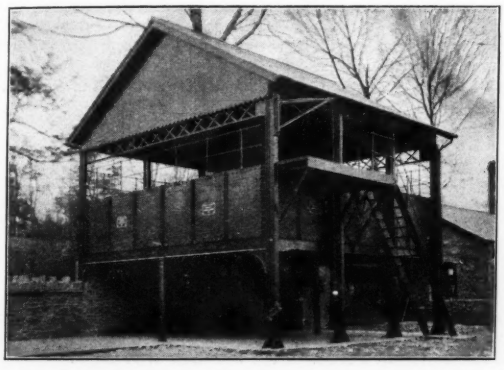
General View of the New Works.



The Gasholders with the Station-Meter and Governor House.

envy and admiration by all those interested in gas undertakings of similar size. The Directors and shareholders of the Company are to be congratulated upon their possession.

Losing no time, and with a view to increasing their business immediately, the Directors instructed Messrs. Willey and Co.,



The Purifiers.

Limited, to make the necessary arrangements for holding a lighting and cooking-stove exhibition in conjunction with the formal opening of the new works, and have also arranged to canvass the town for additional consumers on the penny-in-the-slot installation system.

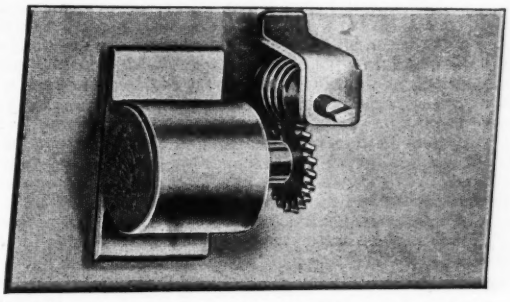
VEEDER DIRECT-READING METER COUNTER.

For years the action of gas-meters has been enshrouded in mystery to a certain class of individuals; and the records of its dials have been regarded with the utmost suspicion—a pretty general belief being entertained that the latter could be made to tell against the consumers. A great deal of the mystery referred to has been dispelled by the meters shown at exhibitions of gas

The Face of the Veeder Meter Counter.

appliances, while attempts to remove the unfavourable impression as to their accuracy have been made by the issue, with the meter-cards, of instructions in the reading of the indices; and those who have mastered them have probably found that the inspector and his employers are not the knaves they were supposed to be. There are many people, however, who will not trouble themselves to take down from the meter dials and work out the few figures necessary for ascertaining their quarter's gas consumption; they want to see it at a glance, without having to make a calculation. An attempt has now been made to meet their requirements in the way shown in the illustrations.

Every cyclist has doubtless heard of the Veeder cyclometer, or mileage recorder. We have lately learnt that the Veeder Company have for some time been experimenting with a view to rendering this instrument adaptable to gas-meters; and the result of their labours will be seen in the accompanying illustrations, which show the front and back of one of their "direct-reading" counters—the former being a full-size view. It will be noticed that these counters show the state of the meter at a glance; and we are informed that they will work at any pressure that will move the mechanism of the meter itself.



Back View of the Veeder "Direct Reading" Meter Counter.

The register operates in decimals; and the counters are made for meters of all the standard sizes. In 3 and 5 light meters, the dial records up to 10,000 cubic feet in units of 10 feet; and there is a 2-feet proving-hand. Meters of the size are also made with an auxiliary proving-hand registering 0·2 cubic foot for each revolution. This hand is necessary in order to comply with the legal requirements in certain localities; and it is useful for the detection of leaks. In 10 and 20 light meters, the dial records up to 1 million cubic feet in units of 100 cubic feet; and there is a 5-feet proving-hand. The dials of the 30-light and the 45 to 60 light meters also record up to 1 million cubic feet; but the proving-hand in the first-named size is 10 feet, and in the others 20 feet. The 100, 150, 200, and 300 light meters record up to 10 million cubic feet; the three former sizes having each a 50-feet, and the latter a 100-feet, proving-hand.

The fitting of the new dial to meters will entail a small extra initial cost; but it is believed that this will be amply recouped by the saving of the inspectors' time in reading.

The Veeder counters have already given evidence of their utility as applied to voting machines, cash registers, &c.; and the Company who manufacture them—whose sole representatives in Great Britain are Messrs. Markt and Co., of 6, City Road, E.C.—entertain the confident hope that they will prove equally serviceable in the new field which they are seeking to open up for them in connection with the gas industry.

GAS COMPANIES AND THE PURITY AND ILLUMINATING POWER OF THE PUBLIC GAS SUPPLY.

By H. Leicester Greville, F.I.C., F.C.S., &c.

Is finality ever to be reached over this question? Progress there has been; but the end is still probably distant. Of changes in comparatively modern times, the mitigation of the severity of the sulphuretted hydrogen test and the abolition of any test for ammonia may be regarded as an absolute settlement of these respective questions. In regard to "sulphur compounds other than sulphuretted hydrogen," the gas companies are on the advent of having an unlimited licence. Whether this is altogether wise on the part of the Legislature may be an open question. In the evidence before the House of Commons Committee on "The Removal of Sulphur Restrictions Bill," reported in the "Journal" for May 1, it was admitted that the sulphur might occasionally reach an abnormal amount. In the cross-examination of Sir George Livesey by Mr. Lloyd, this occurs: "Your averages have run up in some cases to 47·4?—The fact is that I felt the matter of such absolute unimportance that I have not looked into what the averages were. I have known what the excesses were; some of them. The highest, I believe, was 75 grains. Mr. Lloyd: I have 78?—That is near enough."

In the face of this evidence, Is it wise to allow the gas companies an *unlimited* license over sulphur compounds? I am quite prepared to admit that the old stringent regulations over sulphur compounds—ranging between a limit of 17 and 22 grains per 100 cubic feet, with a penalty of £50 for excess—was a troublesome and irksome condition, and involved the use of lime as a purifying material. This involved in many cases the question of nuisance from the discharge of foul lime. In my opinion, this has always been a matter of want of proper scientific management; but this question may now be relegated to the past. The present consideration is whether it has been altogether advisable to give the gas companies an absolutely free hand, or to enlarge their limitations so as to cover all possible exigencies of reasonable management, and yet afford some protection to gas consumers! I have no hesitation in stating that, in the old days of flat-flame burners, the consumption of an amount of gas to afford a fair light in a decent-sized room would, if the gas contained 80 grains of sulphur per 100 feet, render the atmosphere unbearable.

It is the almost universal use of the incandescent burner, with its limited consumption of gas, which has saved the situation. When a 50-candle light can be obtained from the consumption of from 2 to 2·5 cubic feet of gas per hour, with a fairly ventilated room, sulphur compounds are not of much account. There is, however, another question, and that is the use of gas for heating purposes. A gas-stove, properly connected with a chimney, is possibly "*sans peur et sans reproche*." The products of combustion have their exit, just as those from coal would do; but will the condensing stoves, in which the combustion products escape into the living room, meet the emergency of eliminating the larger proportion of sulphur possible in the gas under the new regulations? Further, domestic gas-stoves for cooking purposes, which often, when any large cooking operations are in progress, may consume, under the most moderate estimate, some 30 cubic feet per hour, are perfectly innocuous if arranged so that the combustion products are conducted into a chimney. This arrangement is, however, not always available; and in many cases the products of combustion escape into the house, or at all events into that portion of the house devoted to cooking. Where the proportion of sulphur in the gas has been excessive, the smell from the combustion products has been painfully noticeable.

Passing over this aspect of the question, I can see no reason why the sulphur compounds in gas should not be kept in the most extreme cases to a mean of under 40 grains per 100 cubic feet, even where lime is used for the removal of carbonic acid. The only necessary condition is that sulphuretted hydrogen must be removed first and carbonic acid afterwards. The gas, after passing through oxide properly managed to arrest sulphuretted hydrogen, the lime is used subsequently to remove carbonic acid. Under these conditions, no "flushes of sulphur" are ever possible, which almost invariably arise from the action of carbonic acid or a flush of air, or the abuse of the use of the exhauster on lime which has previously been in contact with sulphuretted hydrogen, and taken up some proportion of sulphur compounds.

So much for the question of impurities. The further consideration remains—viz., that of illuminating power. With regard to a standard of light, few who have had the necessary experience would wish for a better one than the 10-candle pentane. When I look back on the history of past years—from the modest, but unsatisfactory, candle upwards, through various proposed substitutes—no one but an old photometrist knows the painful experience and the painstaking work which marked the extinction of the old candle as a photometrical standard. It was not a domestic candle whose erraticisms of light and of wick could be crudely adjusted by equally crude snuffers in the hands of a correspondingly crude operator. It was a scientific and expensive candle, whose composition and wick were carefully regulated by scientific experts. No modern photometrist lamented its decease, and no one has written its epitaph. We have now a satisfactory standard; and the only question remaining for solution is the method with regard to the apparatus to be used for testing, and the conditions of combustion of the gas for developing the light which should be fairly credited to the gas. On the latter point, the question has been compromised by the adoption of the Carpenter argand.

With regard to apparatus—that is what I might call mechanical appliances necessary to enable a skilful operator to compare the light of the gas with that of the standard—things are not settled. The adoption of the Carpenter burner needed a modification of the table photometer prescribed by the Gas Referees, involving a movement of the light to be tested. All competent photometrists admit that this course should, if possible, be avoided. Two fixed lights and a moveable screen is an arrangement agreed to by all parties as being the best. The modification of the Gas Referees seems, apparently, to have been made with the view of not placing the gas companies in the invidious position of incurring further expense over that involved in the comparatively recent adoption of the table photometer as a standard instrument. There is, however, no reason, so far as I know, why the present system of standard and burner should not be available on an ordinary bar photometer, with an advantage of fixed lights. Why cannot the Gas Referees authorize both systems as fulfilling legal requirements? This would place it within the power of gas companies who have not the advantage of a table photometer of testing their gas with very little extra expenditure under the official requirements. Theoretically, there should be no difference in practical results between the two systems. If there is any suggestion that there would be a difference, the matter, before a final decision, could be easily settled by such a competent body as the Gas Referees, more especially as the question is theoretically and practically a simple one to the many complex matters which they have had before them for solution in a difficult and honourable career of many years' standing.

At the present time, some settled and satisfactory method for the determination of illuminating power is absolutely necessary. Although it is a matter now of common knowledge that, by the incandescent system of lighting, illuminating power is becoming more a question of calorific intensity than of illuminating hydrocarbons, the time is not yet sufficiently advanced for a heat test to replace the ordinary light test. What will come in the future, who shall say? The beacon tower of science ever grows higher; and as its light spreads, the unknown becomes the knowable.

OBITUARY.

The death is announced, at the age of 72, of Herr Heinrich Gruner, of Bâle, one of the founders of the German Association of Gas and Water Engineers.

PERSONAL.

We are pleased to notice that the name of Mr. J. Armitage Drake, of Drakes Limited, was among those recently added to the Commission of Peace for the borough of Halifax.

Prior to leaving the Halifax Gas-Works to enter the service of the Scarborough Gas Company, Mr. J. F. Smith, the Assistant-Manager, was presented with a combined dressing-case and travelling bag, together with a smoker's cabinet, both bearing a suitable inscription, as a token of the esteem in which he was held by the staff and workmen. The presentation was made by the Engineer and Manager (Mr. J. Wilkinson), who conveyed to Mr. Smith the congratulations of the donors on his success, and expressed their united good wishes for his future prosperity. He added that they would all miss him, while he (the speaker) would lose a very valuable helper. Mr. Smith responded in appropriate terms, and said he should prize the gifts very highly as reminders of his many friends at Halifax.

The Lucas Lamp Patent declared Void in Germany.

A patent action which has been pending for some years in Germany, has now been concluded. The firm of Julius Pintsch, with the United Metal Wares Works, late Haller and Co., of Berlin, as subsidiary interveners, petitioned against the validity of German Patent No. 138,210—the so-called Lucas patent—owned by the General Lighting and Heating Industry Company, of Berlin; and their petition came before the Nullity Division of the Imperial Patent Office on April 19 for settlement. The President of the Court, after a sitting of about five hours' duration, pronounced judgment to the effect that the patent in question was annulled in respect of its whole range, and that the costs of the petition were to be borne by the defendant Company.

Midland Association of Gas Managers.—As announced in last Tuesday's "Journal," the Association will hold their spring general meeting at Coventry on Thursday of this week. After transacting, at the Queen's Hotel, the formal business on the *agenda*, the members will be conveyed in brakes to the new works of the Coventry Corporation Gas Department, over which they will be conducted by the President, Mr. Fletcher W. Stevenson, the Engineer of the works. On the completion of the inspection, the party will proceed to the works of the Daimler Motor Company, Limited. Subsequently, the members will dine at the Queen's Hotel, on the invitation of the Gas Committee.

A RUN ROUND THE HARROW GAS-WORKS.

"A most comprehensive and interesting gas-works" was the verdict on Saturday afternoon on parting with Mr. J. L. Chapman, the Engineer of the Harrow and Stanmore Gas Company, and his chief assistant, Mr. C. Chambers, at the entrance-gates of the works. The occasion was a visit of the London and Southern District Junior Gas Association; and there were few of the members who did not succeed in finding good reasons for accompanying their President (Mr. Walter Grafton) and Hon. Secretary (Mr. P. F. Scarth) to view first the gas-works, to take tea with Mr. Chapman in his roomy and pleasant office, and subsequently to visit some of the delightful parts of Harrow, and its world-wide known schools and church, permission to do which Mr. Chapman used his influence to obtain. The indebtedness of the members found hearty expression before leaving the gas-works. Beyond saying this, further reference to the visit may be omitted; but what was seen at the works may be traced in the shape of an outline description of the plant, into which may be woven a little interesting information concerning the Company.

Looking on a map in Mr. Chapman's office, it is seen that the Company supply a most irregularly shaped district, bordered by no less than five Companies—the Gaslight and Coke, the North Middlesex, the Brentford, Watford, and Pinner—and that the district contains some 60 square miles. As the district is developed—and the service of rapid electrical trains to and from London will now give an impetus to this—there will be a corresponding development of the Harrow Gas Company. It is bound to come; and therefore the Directors are making on the works provision betimes for the future—the recent years' increases in the neighbourhood of 11 and 12 per cent. having warned them that for the undertaking a new period of activity has set in. And as new promising estates are opened up, the Company are there in good time by arrangement with the owners. The irregularity in the shape of the district does not much concern the Company; but the irregularity of the levels and the great distances, of course, necessitate a watchful care of pressures. On entering the gas-works, next to the offices is found a renovated building in which the governors are all located. With walls faced on the interior with white glazed bricks, with a green glazed brick dado, the house looks quite spick-and-span. In it there are collected five governors, all of the Parkinson and Cowan type. The Company have three direct districts, and one 15-inch main which runs a mile from the works without being tapped, and which at present joins on to the Stanmore district mains. Eventually this main will be carried right through the district. There are three large governors and two small ones. One of the small governors is a protection against trouble in the event of a wrong valve being closed; and the other one controls the supply in Harrow. One of the large governors supplies Sudbury, and the remaining two Stanmore. There are two 15-inch mains leading to Stanmore (one being the main untapped *en route*); and these are worked at 55-10ths pressure. The Sudbury main is a 15-inch one, and that is worked at 40-10ths pressure. The 10-inch main into Harrow town, which is very rising ground, is worked at 22-10ths pressure. This governor-house has been in use about twelve months.

The extensions of the plant that have been made have all come well within the last ten years, and also within that period the other parts of the works have been practically reconstructed. The present works occupy an area of about 2½ acres; and, under the powers of the Company's 1893 Act, notice of purchase has lately been given to owners of property adjoining the works. When this transaction is completed, the area of the works will be about doubled; and, from what can be seen, the Company will not be long before they will be compelled to bring the addition into use.

The next extension to which invitation to inspect is given is the carburetted water-gas plant. But before entering the building housing it, the new and fine meter-house is looked into. There are seen two 30,000 cubic feet per hour meters—one for the carburetted water gas, and the other for the coal gas; the former being by the Gas-Meter Company, and the latter by Parkinson and Cowan. In the carburetted water-gas house, two sets of Messrs. S. Cutler and Sons' plant are found, each capable of making 350,000 cubic feet per day. In an adjoining house, with a part glazed roof, and thus exceedingly well lighted, are situated the blowers and exhausters; and passing into the next building are found in one portion a pair of boilers, and (a little removed from them) a large Galloway boiler with space in reserve adjacent for the installation of another, when in the future it may be required. The two small boilers are worked together; and the large one (which is equal in capacity to the two small ones) alone—the practice being (Colne Valley water is used) to change over every six months. All the boilers are fitted with Meldrum Bros.' furnaces.

Following the disposition of the plant rather than the order of process, the visitor is next introduced to the exhauster-house (the work connected with which was carried out about three years ago). In it are two exhausters, each of 30,000 cubic feet capacity, and two of 15,000 cubic feet—all of the Donkin type. A pump-room adjoins. In the yard outside is one of Kirkham, Hulett, and Chandler's washer-scrubbers; and it is remarked how noiseless is its operation, owing to it being fitted with friction gear instead of cogs. Next to it is an independent washer for taking the oil out of the carburetted water gas. Ammoniacal liquor is used in this; and this washing effects a great saving in oxide. In the group of plant situated here is noticed a Livesey washer.

Mr. Chapman has gone from horizontal to inclined retorts. Next door to the house containing the latter is a small, old one, with three beds of horizontal sixes, 9 feet long. These have been relieved of further service; and they are marked for dismantling. In the inclined house, are four settings of sixes, capable of making from 320,000 to 350,000 cubic feet per day, according to conditions. The labour worked out last half year to 1·91d. per 1000 cubic feet; and the fuel to 14½ per cent. The size of the house and other circumstances must be considered in connection with the figure as to the cost. But there are these outstanding facts to be noticed, that since the inclined retort-house was brought into use, a saving of £1000 a year in respect of labour and fuel has been made, compared with the horizontal retort working with hand labour; the price of gas has since been reduced in the inner area by 4d. per 1000 cubic feet and in the outer area by 7d.; while the "A" shareholders are now in the enjoyment of a dividend 1⅛ per cent. higher than before, and the "C" shareholders of a dividend 1½ per cent. higher.

But to return to the equipment of the house. The bench since it was put up has turned out over 100 million cubic feet of gas, and has required no expenditure upon it for what can really be called repairing. The brickwork is in excellent condition; and here it may be said that with the whole installation, the name of Gibbons is associated as the contractors. "Very satisfactory indeed" is Mr. Chapman's testimony to their work. On the discharging-stage, there is only one point that need be mentioned; and it is that, as the spent charges fall from the upper retorts, they are received and directed through shoots below by an invention of Mr. Masters, of Messrs. Gibbons Bros., upon which useful device a little improvement has been made on the works. The coke descends through the shoots into the basement, and from there is wheeled out to the coke ground. On the way to the charging-floor, the coal-store at the side is seen. Coal is responsible for a good deal of the labour here; for it has to be carted from the Metropolitan Station at Harrow-on-the-Hill, some 1¼ miles distant. It is delivered at the side of the coal-store, elevated, and the coal not required for the overhead hoppers in the retort-house is diverted on to a push-plate conveyor for delivery into store. On the charging-floor, it is noted that there are two overhead hoppers to each bed; and each hopper is again divided vertically into separate compartments, each of which contains 7 cwt. charges; so that the overhead storage is equal to 28 cwt. per bed. This is found quite sufficient, as, with six-hour charges, two retorts in each bed are charged every two hours. The working as a rule is with 7 cwt. charges. In these retorts, Mr. Chapman has used a variety of coals; and he reports that he has had no trouble from creeping. Under his present contract, nuts are being employed. The whole arrangement of the house is of the simplest character; and the testimony already referred to is founded on a three years' experience.

With regard to coal gas condensing, this is accomplished by an 18-inch steel tube running round the old retort-house, then out into the yard, there delivering into an 18-inch air-condenser. The water gas is passed through a 14-inch horizontal condenser before sending it through a water condenser. Crossing the yard from the coal-gas condensers, a smithy is passed; Mr. Chapman remarking that having his own smith is a great advantage. The purification is all by oxide; and the purifiers are all in the open. The four water-lute boxes that were formerly used for coal gas have been turned over to the carburetted water gas. They are 18 ft. by 12 ft.; while the newer luteless purifiers for the coal gas are 25 feet square, and (it is worth noting) the inlets are at the top. By the side of the coal-gas purifiers, Mr. Chapman called attention to an arrangement by means of which all the syphons can be cleared by one fixed pump. There is a tube running into each syphon; and these tubes are all brought to this one point—each being fitted with a cock. When a particular syphon has to be pumped, that cock is opened, and the syphon cleared. With this system it is unnecessary to run all over the place if anything goes wrong in this connection.

While retracing our steps along the main road through the works, it is mentioned that underground there are two old gasholder tanks, one for receiving spent liquor, and mixing it with water before sending out, and the other for the reception of the tar and ammoniacal liquor. The oil-tank for the carburetted water-gas plant is situated at the side of this main road. It has a capacity of 28,000 gallons; and a float gives external indication of the quantity of contained oil. The tank was originally built in the ground, but it was found that the contact of the earth had a deteriorating effect on the plates. The tank rests on a concrete foundation and now a wall has been built all round it from the foundation to a little above the ground-level. Attention is also directed to the small relief holder, which was constructed in one of the original gasholder tanks. There are two gasholders on the works, of a combined capacity of 500,000 cubic feet—one 350,000 cubic feet, and the other 150,000 cubic feet. There is also a holder at Stanmore, about 6 miles away—this having been left, when the old Stanmore works were dismantled, as a balance holder for the night pressure. The holder is found to be very convenient; and it is interesting to note that about 12.30 in the day the holder always goes down a plate or so, showing what a large consumption of gas there is in that district for cooking.

The Company have been working up their own ammoniacal liquor since 1896; and they have in use one of Walker's plants equal to 1 ton of sulphate of ammonia per day. The still is by Messrs. Joseph Taylor and Co.; and it has given every satisfaction. The production of sulphate is about 80 tons a year; work being carried on during alternate months.

Excellent offices are situated at the entrance to the works; and while here some few other points of interest are gathered. In the general office are fitted bijou inverted lights; and Mr. Chapman is reminded by them that a church in the district is now being fitted with the Bland inverted lamps. Then in a corner of the office is pointed out a cabinet, an examination of which discloses that the convenient card system of registration has been adopted here for ordinary and prepayment consumers and hired stoves. The Company have now about 4400 consumers—about equally divided between the ordinary and prepayment classes. The next room is devoted to photometry. The carburetted water gas is tested continuously; and for this purpose there is a photometer by Messrs. Alexander Wright and Co., fitted with a pentane lamp. An ordinary bar occupies the side of the room for testing the mixed gas, which is kept well above the standard of 15 candles. The output of gas is now about 130 millions a year; and the largest consumers are quite 10 miles from the works. Passing upstairs to the Engineer's and staff offices, drawings and maps are all found carefully packed in nests of drawers, with, on the latter, the gas-mains carefully drawn in up to date, with special notes in red ink. Regarding the public lighting, many of the public lamps are lighted and extinguished by Gunning's clockwork arrangement; and Mr. Chapman freely attests to their satisfactory operation.

More than convinced that we have been inspecting a most interesting and up-to-date works, the offices are about to be left when attention is directed to the fact that all the clocks on the works are synchronized by an electrical system; and this also is found to work well. This clinched the evidence of the up-to-dateness of this Company supplying in one of the most charming suburbs of London.

A NEW IMPREGNATING FLUID FOR MANTLES.

Cheaper than the Thorium-Cerium Process.

THE only successful and popularly approved incandescent gas mantle has been that made with an impregnating fluid composed of thorium and 1 per cent. or so of cerium. The successful mantle came; and it has within the past score of years forced its way, solely by its strength of merit, into palace and cottage the wide world over. The frailty of the mantle was at one time held up as its greatest reproach; but it has, by its indisputable value as an economical illuminating agent, outlived censure in that one respect. It is now recognized that a well-made mantle, frail though it appears, will in use stand a fair amount of vibration, as is proved in street lighting and industrial establishments. To our mind, a matter for greater concern (though any mantle showing increased durability would be acceptable) is the fact that over the past twenty years, the incandescent mantle has been solely dependent upon the thorium-cerium impregnating fluid. Inventors have tried time after time to get away from it; but without any sufficient success to bring their alternative methods into prominence. And the result of the reliance on, and the indispensability of, thorium has been to make it the object of something akin to a "corner," and of the machinations of market operators. The price was doubled; and it has been—it is said only temporarily—decreased to about its former figure. How soon there will again be an upward move will depend upon the period that it takes to effect the purpose of those who so largely control.

This kind of thing is not calculated to give confidence; and therefore if an impregnating material can be found that will serve as a competitor with thorium, or will displace it if cheaper, then all associated with the gas industry will be most thankful. Mr. H. T. Grainger, of No. 16-17, Devonshire Square, E.C., states that he has discovered such a material for impregnating mantles, and its cost is so insignificant that mantles made by it ought easily to be retailed, with profit, at about 2s. per dozen. Let us go back a bit. It is now some three years ago that Mr. Grainger first turned his attention to mantle making; and he produced one which he calls the "Tuffo," which, as the name implies, claims as its special virtue a strength above all others. That mantle is made after the manner of other mantles, and is then "chemically treated by a secret process" to strengthen it. The mantle (which is somewhat yellow in appearance) does not burn off with the rapidity of ordinary mantles; and, when it is burnt off, it is quite black. In this condition, Mr. Grainger demonstrates its strength by swinging it round and round, and rolling it on the floor. One so treated was re-boxed, and taken from his office to that of the "JOURNAL;" but, on putting it on a burner, it quickly fractured. The treatment, however, that it underwent would not be fair to any mantle; and a second one that was burned off on the burner in the ordinary way is standing well, and what is more is giving an excellent light. On the gas being ignited the first time, it is noticed that the incandescence—contrary to what is usual—gradually develops from the bottom. Subsequently, the incandescence of the mantle is completed immediately on the lighting of the gas. Mr. Grainger asserts that he has had these mantles under observation in workshops and other places where vibration and draughts freely obtain, and they have stood well for many months.

But as to the new impregnating material. No mantles made by it are yet obtainable; but Mr. Grainger informs us that some are now being produced. Again we are faced by the information that this is to remain "a secret process." At the moment, the most interesting part of the information is that the chemical from which the impregnating fluid is made only costs about 2d. per lb., compared with 50s. per kilo. for thorium. This is of the highest importance if the chemical (whatever it is) is indestructible by heat. Mr. Grainger asserts that it is; but until mantles are available which can be put to proper test definite statements on this head must be withheld. The inventor himself admits that the mantle has not yet been thoroughly tested in respect of wear and tear; but he believes it is going to be almost an "everlasting" mantle. If this is true, it will create quite a revolution in lighting. As to the illuminating power, it is said that the light which will be yielded by it will be far greater than that of the former mantle. All that can be said at present in this respect is that a number of pieces of material such as wool, cotton, cotton waste, and twigs that had been steeped in the new fluid gave, on being held in a flame, brilliant incandescent points. Beyond these statements we cannot go until completed mantles are at disposal; but sufficient has been said to arouse interest in the matter. If fortunately Mr. Grainger has discovered such a cheap impregnating material which in a bunsen flame will be as indestructible as thorium and cerium, then he will have conferred a no mean benefit on not only the gas industry, but mankind generally. We shall see.

Explosions of Coal Gas and Air.

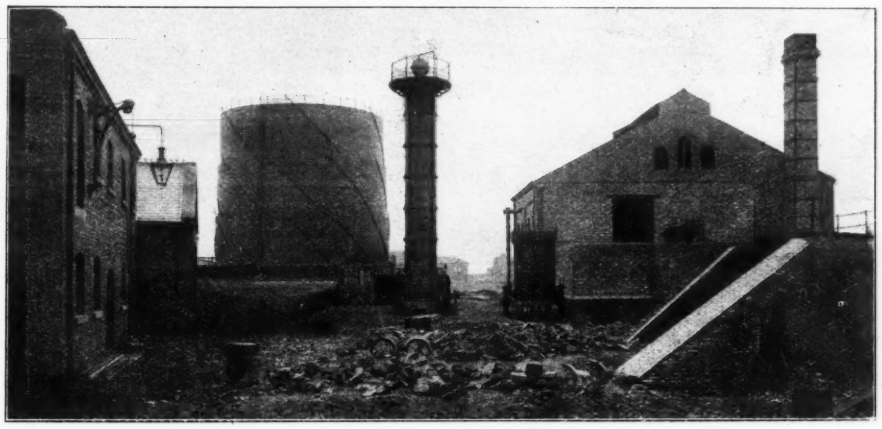
In the course of a lecture delivered before the Royal Society by Professor Bertram Hopkinson, he investigated the explosion of homogeneous mixtures of coal gas and air at atmospheric pressure and temperature by means of platinum resistance thermometers placed at various points in the explosion vessel. The lecturer found that the pressure of the ignited gas at the centre of the vessel is increased during the spread of the flame from one atmosphere to six. During this time it loses no heat; and the rise of temperature observed is from 1200° C. to 1900° C. With a mixture containing one volume of gas and twelve of air the spread of the flame is very much slower—about 2½ seconds elapsing before all the gas is burned. Owing to the slow propagation of the flame, convection currents play an important part during the process of ignition. The burned gases rise to the top of the vessel, and the last portion of gas to be ignited is not close to the wall, but immediately under the spark, and a short distance from it; but though the flame is propagated very slowly, the combustion of any given portion of gas, when once started, proceeds almost as rapidly as in the stronger mixture. There is no "after-burning" in the sense of the slow completion of a reaction already begun. Within 0·1 second before the time of maximum pressure, some gas is still unburnt; within 0·1 second after, the whole gas is completely burned, and the mixture everywhere is in chemical equilibrium. Incidentally, the difference of temperature between a fine wire immersed in the gas and the temperature of the gas is determined by comparing the temperatures of two wires, one having double the diameter of the other, placed close together in the same explosion. The error due to radiation is thus found; and it is shown that if a wire 1-500th of an inch in diameter is getting hotter at the rate of 1300° C. per second, it must be 200° C. colder than the gas surrounding it. The results are used to find the actual temperature of the gas from that of a wire 1-1000th of an inch in diameter immersed in it; and the conclusion is drawn that the temperatures in a gas-engine cylinder cannot be obtained by the use of a wire thicker than this, except by applying corrections amounting to several hundred degrees centigrade. The bearing of the results on the question of "after-burning" in the gas-engine was discussed by the lecturer, and it was shown that the high specific heat of the products of combustion, together with some loss of heat during the passage of the flame through the compression space, accounts for all the peculiarities of the gas-engine diagram. The form of diagram obtained with weak mixtures is due simply to the very slow propagation of the flame, and not to any delay in the attainment of chemical equilibrium at a point which the flame has already reached.

Hereford Ratepayers' Memorial.—In our last issue, there was reproduced a memorial presented to the Hereford Town Council, asking them to consider the claims of Mr. Parlby, the Gas Manager, with a view to his withdrawing his resignation. It was stated at the time that this memorial bore 61 signatures; but this has since been corrected by a letter to the "Hereford Times," in which the writers say that the petition was signed by 117 persons.

Mr. Martin on "Coal Conservation and Power Transmission."—Referring to Mr. A. J. Martin's paper at the Society of Arts on "Coal Conservation and Power Transmission," the "Engineering Review" says: "Although, taken as it stands, Mr. Martin's scheme is quite beyond the range of practical politics, his paper is distinctly worth reading, and may have the effect of stimulating enterprise in the direction indicated, on a less ambitious but more practicable scale."

THE NEW GAS-WORKS OF THE KIRKBY-IN-ASHFIELD URBAN DISTRICT COUNCIL.

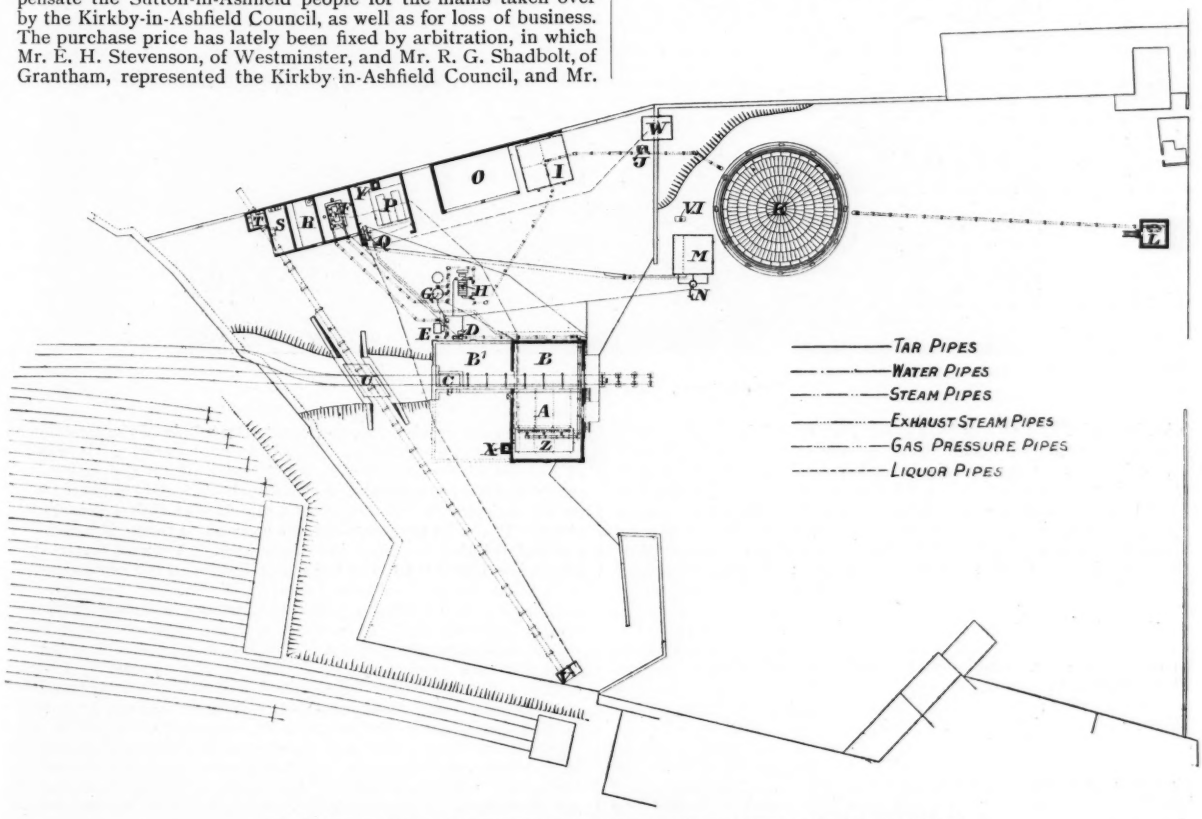
INVITATIONS have been issued to the members of the Kirkby-in-Ashfield Urban District Council and to a number of gas engineers in the neighbourhood to be present to-morrow (Wednesday) at an inaugural inspection of the Council's new gas-works, the following particulars in regard to which (sent to us by the contractors) will be of interest.]



A View from the Entrance Gates.

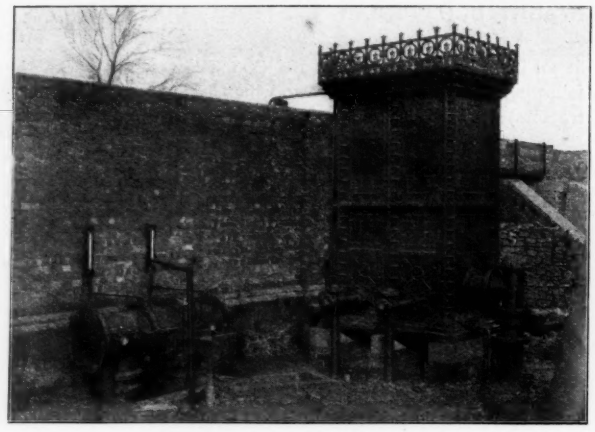
Up to the end of September, 1905, the inhabitants of Kirkby-in-Ashfield obtained their gas supply from the Sutton-in-Ashfield Urban District Council. The Sutton Gas Act, 1878 (sec. 41), enacted that any Rural Sanitary Authority within the area of supply which should become an Urban Sanitary Authority might apply for powers to purchase their portion of the Sutton undertaking, and construct gas-works and supply themselves. This the Kirkby Council did under the authority of the Kirkby-in-Ashfield Gas Act, 1904, and proceeded to build their own gas-works. In connection with the purchase clause, they had, of course, to compensate the Sutton-in-Ashfield people for the mains taken over by the Kirkby-in-Ashfield Council, as well as for loss of business. The purchase price has lately been fixed by arbitration, in which Mr. E. H. Stevenson, of Westminster, and Mr. R. G. Shadbolt, of Grantham, represented the Kirkby in-Ashfield Council, and Mr. Corbet Woodall, of Westminster, and Mr. J. E. Fenwick, of Retford, the Sutton-in-Ashfield Council, with Mr. A. J. Ram, K.C., as Umpire; and the amount awarded to Sutton was £13,234.

The Kirkby-in-Ashfield Council obtained the services of Mr. R. G. Shadbolt, of Grantham, to draw up plans and specifications for the new gas-works, so as to suit their present and prospective requirements. The site selected adjoins the Midland Railway, and is very convenient in respect of being able to obtain a line into the works from the adjoining railway sidings. A portion of the site was an old stone quarry, partly filled up with refuse—the

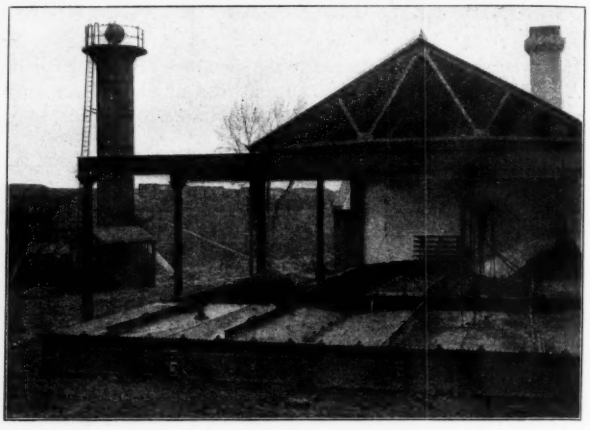


PLAN OF THE KIRKBY-IN-ASHFIELD NEW GAS-WORKS.

A. Retort-House.
B. Coal Store, Roofed over.
B1. Open Coal-Store.
C. Weighbridge, with Office underneath.
D. Tar Extractor.
E. Water Condenser.
F. Exhausters and House.
G. Tower Scrubber.
H. Washer Scrubber.
I. Purifiers.
J. Rotary Meter.
K. Gasholder.
L. Governor and House.
M. Tar and Liquor Tank.
N. Tar and Liquor Separator.
O. Lime Shed.
P. Boilers and House.
Q. Three Pumps—Tar, Liquor, and Water.
R. Workshop.
S. Mess Room.
T. Lavatory.
U. Bridge over Culvert.
V. Drain-Sump.
VI. Bore-Hole Sump.
W. Water-Tank.
X. Retort-House Chimney
Y. Boiler-House Chimney.
Z. Retort-Bench.



Tar Extractor and Vertical Condenser.

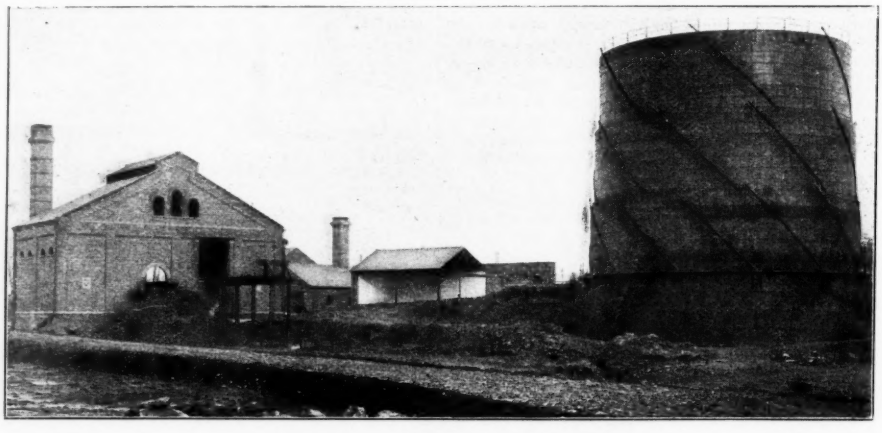


Purifier-House.

ground having been used as a tip; and some of the land was of a boggy nature, and the levels varied considerably. In designing the works, Mr. Shadbolt made good use of the latter feature, by placing the retort-house on the lower level of the upper part of the plot, so that an overhead railway-siding could be got into the coal-store alongside the retort-house above the stage-floor level. The exhauster and purifiers are fixed on the higher levels of the same plot; and the tar and liquor separator, the tar and liquor tank, and the gasholder and tank, are built on the lowest level —viz., in the disused quarry, which is much lower than the rest of the ground. This arrangement also enables coke to be very conveniently stacked from off the staging outside the retort-house gable wall. Tenders were invited; and the contract was placed with Messrs. Robert Dempster and Sons, Limited, of Elland, on Dec. 20, 1904. The work was finished ready for the water to be turned into the gasholder tank on Aug. 23, 1905, and gas was supplied to the town on Sept. 29, 1905. We give a block plan of the works, and the accompanying photographs will illustrate the different elevations.

The first thing to be done when starting the contract was to lay a 30-inch drain from the top to the bottom of the works, so as to allow the ground to be thoroughly drained. The drain is crossed by the railway siding; and at this point an opening has been left in the embankment, the metals being carried by ∪ trough, so as to enable the drain to be always got at, and to give access by cart from one side of the railway siding to the other.

The retort-house contains at the present time a stack consisting of three arches, each having settings of six ⌂ retorts,



Retort-House, Gadd and Mason Holder, &c.

22 in. by 16 in. and 10 feet long inside, set over Waddell's patent tubular regenerators. The hydraulic main has been fitted with Mr. G. Helps's patent anti-dip arrangement, by means of which, by utilizing the back-pressure of the gas, the liquor in the hydraulic can be displaced, so as to work with unsealed or sealed dip-pipes as desired. The house is arranged so that it can be doubled in length with the minimum amount of inconvenience or expense. It is on the stage-floor principle; the charging floor being composed of strong steel joists, between which are fitted arched channels, and concrete reinforced with expanded metal, finished off with blue paving-bricks. Alongside the house is the coal-store; and before entering it the railway waggons are weighed on one of Messrs. Denison and Sons' truck-weighing machines. The foundations carrying this machine have been built in the form of a weigh-office; the steelyard being brought down to the ground below, and room being left for desk, stool, &c. The stokers can obtain their supply of coal direct from the waggons—suitable openings being left between the store and the retort-house for this purpose; or when no waggons are in position, a hydraulic hoist has been put down for raising the coal from the low level to the stage-floor level. A suitable opening had been left in the gable end of the retort-house, fitted with an iron platform off which the stokers tip the coke on to the low level. It might be said that the railway siding has been extended through the coal-store into the yard, so that the coke-waggons and the tar and liquor can be easily loaded.

The foul main extends round the retort-house, and drops outside the coal-store into one of Everitt's patent 10-inch tar-extractors. This apparatus, considering its size (being only 18 inches in diameter), is really very efficient for extracting tar fog. Fixed in front of the condensers, it extracts the whole of the tar and tar fog—leaving the condensers simply to cool the gas. It consists of a series of fine gauze screens, through which the gas has to pass; and while thus passing, it is buffeted about in different ways by intermittent or exhaust steam, which also keeps the screens clean. From the tar-extractor, the gas passes through a cast-iron vertical tubular water-cooled condenser, the waste water from which is utilized for filling the water-boshes in the retort-house.

The exhausters, by Messrs. George Waller and Sons, are two in number, each having a capacity of 10,000 cubic feet of gas per hour. Between them is placed the steam-engine to drive them, either separately or jointly. The tower scrubber is 5 feet in diameter and 35 feet high. It has in the bottom a Livesey washer; the remainder being fitted with wooden boards placed on Dempster's improved principle. On the top of the scrubber is fitted one of Messrs. R. Dempster and Sons' revolving liquor turbines, from which water is pumped continuously from the liquor-tank. From the scrubber, the gas passes into one of Holmes's horizontal washer-scrubbers, driven by a steam-engine in the usual way. The engine is enclosed in a small wooden house, well glazed and ventilated; but the rest of the washer is in the open. From the washer-scrubber the gas goes forward to the purifiers, four in number, 12 feet square and 5 feet deep, on Green's dry-lute system, with Dempster's patent connectionless centre-valve in the middle. This valve is of the Weck type, and is complete in itself; the purifier plates being bolted up to it. The purifiers are also fitted with Spencer's vertical hurdle grids; oxide of iron being used as the purifying material. The purifiers are in the open; but at one end of them there is a covered-in oxide shed, as shown on the plan.

The station meter is of the rotary type, capable of passing from 1000 to 10,000 cubic feet of gas per hour; and it is placed in the open. The gasholder is a three-lift spiral-guided one; the inner lift being 60 feet, the middle lift 62 feet, and the outer lift 64 feet in diameter, and all are 20 feet deep, working in a steel tank 65 ft. 6 in. in diameter and 20 ft. 6 in. deep. The governor-house is situated near the road, and is fitted with one of Braddock's 9-inch governors. From the governor the gas is conducted direct into the existing mains, which run in the street close to the governor-house.

In addition to the usual gas apparatus, there is a range of buildings comprising boiler-house, exhauster-house, workshop (this fitted with a smith's hearth and a fitter's bench), and mess-room; while an adjoining building is fitted with closets, &c. Over the exhauster-house, mess-room, and workshop, are the stores, which are reached by means of a wooden staircase from the yard level at one end of the building. There is also a door in the front of the stores, with small jib-cranes fixed alongside, for hoisting the heavy stores. The ceiling in the exhauster-room is finished off with pitch-pine boarding; and there is also pitch-pine panelling round the walls. Around the exhausters, over the bye-pass connections, there is a cast-iron grating, so that these connections are readily accessible. The rest of the floor of this house, and also that of the mess-room, is tiled with red and black tiles. In the exhauster-house there is also fixed a Lowe photometer. At one end of this building, next to the exhauster, is built a boiler-house, 26 ft. 9 in. wide and 30 feet long, fitted with two Cornish boilers, 5 feet in diameter and 16 feet long, working at 80 lbs. pressure; and in one corner of the house are fixed three single-acting vertical steam-pumps, for water, liquor, and tar. Room has been left for another boiler. Between the boiler-house and the purifiers there is an oxide shed, the back wall of which is the boundary on the railway side, one end wall being the boiler-house wall, and the other end and the front being open. The floor consists of brick-paving; and the iron roof is carried by the boundary wall at the back, and on rolled steel joists supported by ornamental cast-iron columns at the front.

The whole of the water required is pumped either out of the drain, which carries practically clear water, or from a sump let into the quarry close to the gasholder. The water is pumped into an overhead cast-iron tank, 15 feet long, 12 feet wide, and 5 feet deep, erected on cast-iron columns, and fitted with a filtering compartment at one end so as to clean the water. The tank has also been arranged so that in summer the Council's water-carts can obtain water from the gas-works.

On March 15, 1905, Mr. S. Shadbolt, who was formerly Manager at Biggleswade, was appointed Clerk of the Works; and on the 1st of September he commenced duty as Gas Manager to the Urban District Council.

OPENING OF NEW GAS-WORKS AT FALKIRK.

THE new gas-works for the Corporation of Falkirk, which have been erected upon the Thornhill Estate, to the north of the burgh, were formally opened last Wednesday. The ceremony was performed by Mrs. Boyle, the wife of the Convener of the Gas Committee; and it consisted of the starting of the exhauster. Thereafter the company walked round the works, and were entertained at luncheon in the spacious building in which are housed the station meter and the exhausters. Unfortunately, the Engineer and Manager (Mr. W. M'Crae) was unable to be present on account of illness. The works were in use for about three months during the winter, and were then closed for touching-up processes; but they will be worked continuously as from the 15th inst. There have already been several descriptions in the "JOURNAL" of the works and of the machinery installed,* so that further details in regard to them are to-day unnecessary; but mention may be made shortly of a few of the principal features of the works.

The Corporation acquired the gas undertaking during 1894. Very soon afterwards, it was found that the works which they retained—being the Grahamston works, the East Bridge Street works having then been closed—were too small for the efficient supply of the town with gas; and as it was impossible to extend the Grahamston works, attention was directed to the question of erecting new ones. Out of several sites which were thought of, that at Thornhill was selected; but the Commissioners having already acquired land at Parkhouse, at the west end of the town, and put up a holder on it, an agitation originated in the Council for the erection of the new works there—a movement which led to several years' delay. Meanwhile, on account of the rapid extension of the town, the Grahamston works became uncomfortably near the margin of safety. It was, indeed, matter of wonder how the then Manager—Mr. J. Kincaid, now Manager at Kirkcaldy—was able to cope with the increased demand for gas. In June, 1903, the Parkhouse site was abandoned; it having been examined by engineers and adversely reported upon in respect of the quality of the subsoil for foundations. Mr. Kincaid was appointed to Kirkcaldy in the following month, and Mr. M'Crae succeeded him at Falkirk. When he assumed office, he found the question of site undecided. The question which retarded a decision being come to was the procuring of railway facilities into the new works, wherever they might be placed. At the end of October of that year, the Thornhill site was at last adopted; but it was not till the beginning of August, 1904, that an agreement was come to with the North British Railway Company for the construction of a siding, which, it may be noted, is not alone for the service of the gas-works, but sweeps past them, and terminates in an iron foundry beyond. So urgent were matters that, before an agreement was come to with the Railway Company, Mr. M'Crae had the plans and specifications for the new works prepared, and, indeed, contracts for the erection of the buildings had been provisionally let during the month of June preceding. Within a week of the adoption of the agreement with the Railway Company (in August, 1904), a start was made upon the new works, and steady progress was kept up with their erection and equipment, with the result that by October, 1905, the retort-bench was under heat, and shortly afterwards the works were in full use. The construction of the railway has only been begun recently; so that the Corporation have derived no benefit from it in the building of the works.

While it is the case that the gas-works have been erected in accordance with the description given in the "JOURNAL" for the 31st of October last, there is one notable exception—the retort-house plant, which is that of Messrs. R. Dempster and Sons, Ltd., of Elland—on which, in the course of erection, several notable alterations have been made. The retorts are 20 feet throughs, 22 in. by 16 in., ⊃ shaped, but with a specially round curve at the bottom corners, so as to ensure clean discharging. The firing is on Messrs. Dempster's regenerative system, with a furnace at one side of the bench—that which is on the opposite side from the charging and discharging machines—by which arrangement the charging-stage is kept cool and pleasant to work in. Another great advantage tending in the same direction has been found in practice in the working of the through retorts, which is that, instead of closing the mouthpiece at the far end while charging is going on, it is left open; a partial stopper with a long handle being held into it, to prevent the coal being fired out. By this means the smoke and flame attending the process are blown forward, leaving the charging side free, and allowing the man on the charging-machine to see without difficulty what he is doing. A recent improvement on this machine has been the bolting on to the propelling blades of tips of thin plate, cut into strips, which are intended to deal with heavy material (such as pieces of iron) getting into the charge. When this happens, the thin plate (or one or more of the strips of it) are bent, and while the blade itself escapes uninjured, the machine is not perceptibly impaired in efficiency. At the first stoppage, of course, the tip can be replaced in a few minutes.

In the discharging-machine an improvement has been effected, whereby, in the event of the workman failing to observe that the end of the stroke has arrived, the electric current is cut off by means of triggers, and a brake applied. This stops the action of the ram, and prevents any over-shooting, either out or in. In the event of the ram sticking in the retort, which would mean serious damage to it in the course of a few minutes, provision is made for the throwing of the machine out of gear, and the instant withdrawing of the ram by hand. For this operation the brake, having gone on automatically, is held open by a wedge; and when the machine is again started, the wedge falls out, restoring the brake to action. Working with Scotch coal, a good deal of difficulty was experienced on account of the friable nature of the coke, and its liability to ruck up in front of the ram. To overcome this difficulty, over the ram has been placed a hood, the edge of which is of comb construction, and of thin material, the effect of which is that, if an obstruction is encountered—such as carbon on the roof of the retort—the comb gets heated and one or more of the teeth bending, the ram is released, and proceeds on its way. As a matter of fact, it is found that the opening of the retorts at each charge prevents the formation of carbon; and the comb is very seldom brought into requisition. Another improvement has been effected upon the tip of the ram, in this respect—that for a solid plate a box 12 in. by 8 in., open at the top, has been substituted. This gives a surface of 96 square inches to rest upon the floor of the retort; and the bottom edges being rounded, the risk of damage to the retort by the 80-lb. weight of the point of the ram is so small that it has never yet been detected, though the charges operated number 30,000, distributed over nine ovens of eights. Being open at the top, the box receives a supply of water from the sprinkler every time it completes a discharge. From this steam arises, which also acts upon the carbon.

The Opening Ceremony.

For the opening ceremony, besides local representatives, a large number of gas managers, conveners, and directors had been invited. Having assembled in the exhauster-house,

Provost CHRISTIE thanked the company for having responded so kindly to the invitation to attend the opening of these important gas-works. He was sure it would be quite a red-letter day in the history

*See Vol. XCII., pp. 114, 315; Vol. XCIII., p. 356; and *ante*, p. 162.

of Falkirk, for the works would add very much to the prosperity of the town. Falkirk was first lighted by gas in 1830. There was only one Gas Company, who had a monopoly of the lighting of the town till 1845. The "bairns of Falkirk" did not like a monopoly; and in that year a new Company was started, which continued to oppose the old one very keenly for a number of years. By-and-bye, however, the two Companies found that amalgamation was better than competition, and they amalgamated in 1888. Of course, Falkirk was again in possession of a monopoly; but, at the same time, the town was served very well. On account, however, of the great strides the place was making, the two gas-works they had were insufficient to cope with the demand for gas. So, in 1893, the Gas Company promoted a Bill for the purpose of getting statutory powers, and also of acquiring land for the erection of new works. The Town Council of that day resolved to oppose the Bill, and to become themselves, if possible, the lighting authority. There was a very keen contest in Parliament, in which many of those around him took part, on one side or the other. It resulted in the burgh getting an Act of Parliament, and the Company's undertaking was taken over by arbitration. The sum paid was a great deal more than Falkirk had reckoned upon—being somewhere about £84,000. The Corporation proceeded to make gas; but they were at once face to face with the same difficulty that the Company had had, in the insufficiency of the works. While they had power to build new works, great difficulty arose as to the site. They were now standing upon the one which had been selected. They had acquired there something like 12½ acres of land. There was a difference of opinion, as there always was, regarding the site; but the one great difficulty they had was the important one of railway accommodation. Now, one result of their placing the works where they had done was the bringing of the railway, which would open up a large area of most valuable ground, suitable for public works—as suitable as any they could get in the whole kingdom, being in the centre of a district in which there was a great supply of coal, and in proximity to the port of Grangemouth, where were enormous new docks. The first year the Corporation made gas, the output was 78 million cubic feet; and this year their production was 178 millions. If the same rate of progress were maintained, they might look forward to a very large retention of business. They had made ample provision for many years. They were there to open the beautiful new works; and he had pleasure in calling upon Mrs. Boyle, the wife of the Convener of the Gas Committee, to perform the ceremony.

Colonel Laidlaw, of Messrs. R. Laidlaw and Son, of Glasgow and Edinburgh, on behalf of the Engineer and Contractors, presented Mrs. Boyle with a gold key, with which to start the machine. This key was of novel construction, consisting of an ornamental gold plate, about 8 inches in diameter, having in the centre a raised shield bearing an inscription, below which there was an opening fitting the journal of the steam handle. Mrs. Boyle having turned the key, the exhauster started with a slow and steady movement.

Bailie Boyle returned thanks for the presentation, and for the honour which had been conferred upon his wife in being asked to formally open the new works.

Colonel Laidlaw then presented Mrs. Christie, the wife of the Provost, with a gold curb chain bracelet. He said that during a most critical period in the construction of the works, the worthy Provost was called upon to undertake the convenership of the Gas Committee, in addition to the onerous duties of the Chief Magistracy. The opening ceremony might have taken place during the time he held the convenership; but it was found to be impossible to effect this. Had it been otherwise, Mrs. Christie would have been called upon to perform the ceremony, and they thought it appropriate, therefore, that she should receive a *souvenir* of the present occasion.

Provost Christie returned thanks, and read a telegram from Mr. M'Crae, the Engineer, in which he regretted his inability to be present, and trusted that everything would pass off well. On the call of Provost Christie, three cheers for Mr. M'Crae were given.

In perambulating the works, the chief interest was bestowed by the visitors on the charging and drawing machines, and the coke-conveyor, which was furnished by West's Gas Improvement Company, Limited. All the machinery in the retort-house is driven by electricity, obtained from the Corporation of Falkirk. With the exception of the coal-breakers, it was all at work. A number of retorts were discharged and charged again in quick succession; the double operation occupying less than a minute per retort. The charges are about 5 cwt. per retort. Each is weighed automatically by a Dennis and Broadhead weighing-machine, and the weight shown upon an indicator. Beside the indicator is a sheet of paper, divided into separate spaces for each charge of every retort for a week. So soon, therefore, as a charge is completed, the workman notes the exact quantity of coal used; and thus a record is kept of the duty of each retort. In discharging, the time occupied in pushing out the contents of the retort was 15 seconds, and the return stroke was performed in 11 seconds. To show the margin of power possessed by the charging-machine, a cold retort was charged, when it was found that the coal was thrown right through the retort, and 9 feet beyond. It was pointed out that the charging-machine was much heavier than it would be were there a continuous coal-hopper. The charges were delivered into the retort evenly; giving the appearance of rapid shovel charging. The coal dealt with had been in store for six weeks, and was very dry, besides being small. There was, notwithstanding, a clean delivery; there being no coal spilt at the mouthpiece. In the discharging, the coke was all expelled; none being left in the retort. Both machines worked very smoothly and silently in all they did. The working of them was in the hands of ordinary stokers, who had not handled them for six weeks. The working of the plant was explained by Messrs. J. W. Broadhead and H. J. Toogood, representatives of the firm of Messrs. Dempster and Sons.

The company, to the number of about eighty, having dined, and honoured the formal toasts,

Mr. J. W. Broadhead proposed—"The Falkirk Corporation Gas Undertaking." He said their Engineer, and with him the Gas Committee, had to settle the very serious question of what kind of carbonizing plant they were to adopt in their new works; and when this question came before them, inclined retorts were looked upon as the most up-to-date method of carbonizing. But the old horizontal retorts had come to the front again, on account of machinery having been introduced for throwing the coal into the retorts and pushing out the coke—machinery which was originally introduced by M. De Brouwer from Belgium. The Corporation of Falkirk adopted this system; and he ventured to say that they would not regret having done so, and that it would prove satisfactory. The Corporation had done his Company the honour of giving them the first trial with their patent machinery; and the machines the visitors had seen working that day, he believed, spoke for themselves. The works they had had the pleasure of inspecting, all of them were agreed, were well designed, and very well arranged for extensions. The retort-house was complete with modern machinery for dealing with coal brought in by both railway and canal. The retort-settings, of the regenerator type, with through retorts fed by a furnace on one side only, were, he thought, somewhat of an innovation in Scotland. The coke was taken out by coke-handling plant. Manual labour in the retort-house had, therefore, been reduced to a minimum throughout. There had been no money wasted in ornamentation of the works; at the same time they were pleasant to the eye, and were in every way a credit to the Corporation. In that room they had an idea of Mr. M'Crae's notions of proportion. He did not think they had ever seen an exhauster-meter house which had cost so little and looked so well. The Corporation were fortunate in letting their contracts at a time when materials were cheap and labour abundant. The retort-house would have a capacity of 1½ million cubic feet per day, and the whole works had only cost about £45,000, which was below the estimate. If the contracts had been let three years earlier, the Corporation might perhaps have paid £10,000 more for their works. They were very sorry Mr. M'Crae was not with them that day. They wished him a speedy recovery. Bailie Boyle was to be congratulated upon being Convener of the Gas Committee on an occasion like this. The financial year of the Corporation began on the 15th inst. From this date the whole of the gas for the district would be made in the new works; and when the next year was concluded, he was sure Bailie Boyle would be able to come forward with a balance-sheet which would be satisfactory to the ratepayers.

Bailie Boyle acknowledged the toast. He said the new gas-works had been subjected to no mean test. All parts of them had been scrutinized by men who were experts in all the different departments, and had been found to be satisfactory. It was very seldom, when new works of this sort were started, that they found all the parts worked so harmoniously as they did that day. This was a testimonial to the foresight and the ability of their Gas Engineer, Mr. M'Crae. He was one of those who, to the bitter end, refused to agree to taking the works to the present site; and he was very happy to learn now, from Mr. Broadhead, that he and those who were with him, had saved the Corporation a sum of £10,000. But this was not all. The capital of their undertaking would now be about £165,000; and he was told, by expert authority, that if they were to sell it, when these works were completed, they would receive no less than from £180,000 to £190,000 for it.

Mr. W. Ewing (Greenock) proposed—"The Gas Engineer." He said the unfortunate illness of Mr. M'Crae had prevented him being present that day; and it had been suggested to him (Mr. Ewing) that a telegram should be sent from the meeting, congratulating him on the success of the day's operations. The works gave evidence of having been designed by an engineer of experience and ability. The Corporation had now ideal gas-works—more up-to-date than any he knew of; and this result had been obtained through the experience of Mr. M'Crae. The coke-conveying plant was quite a marvel; and the charging and discharging machines were perfect, so far as the hands of man could make them.

[Mr. Ewing's suggestion was adopted by acclamation. A message in the terms suggested, and expressing a wish for his speedy recovery, was accordingly despatched by the Town Clerk (Mr. A. Balfour Gray); and before the party rose from the table, Provost Christie read a reply which had been received from Mr. M'Crae, saying how glad he was that everything had gone well, and thanking the company for their good wishes towards him.]

Mr. W. W. Neilson, who had been deputed to act for Mr. M'Crae in connection with the opening ceremony, replied to the toast.

Judge Flannigan proposed "The Contractors," to which Colonel Laidlaw responded. In doing so, he referred to the historic ground upon which they were met, it being the site of the battle of Falkirk in 1296, as well as of the later one in 1746.

The remaining toasts were "Our Guests," proposed by the Chairman and responded to by Provost Keith, of Hamilton; and "The Chairman," proposed by Mr. D. Macfie (Edinburgh) and acknowledged by Provost Christie.

Water-Meters for Western Australia.—A tender for water-meters was accepted by the Government of Western Australia on behalf of the Metropolitan Works Board at the end of February. The successful tenderer is Mr. George Kent, who is to supply 4266 water-meters for an amount exceeding £17,000. According to the conditions of the contract, the meters are to be manufactured in the State; but, pending the establishment of a factory, the contractor is to be allowed to import from London all that may be required. It is reported that the contract price is nearly 5 per cent. below the cost of importing similar meters from England.

Gas-Works Results at Leeds.—The gross profit on the past year's working of the Leeds gas undertaking amounts to £105,793, from which has to be deducted £2346 for income-tax, and £51,803 for interest on loans, &c. This leaves a net profit of £51,642, of which £30,781 will be applied to redemption fund charges. Of the surplus of £20,861, the Gas Committee hope to be able to hand over for the relief of the rates the sum of £18,000—the amount which had been estimated at the commencement of the year. The previous year, the surplus profits amounted to £20,147, of which £16,119 went in aid of the rates. These figures will come up for consideration at an early meeting of the Gas Committee. The result of the year's working is regarded as highly satisfactory by the members of the Committee.

TEMPERATURE AND EFFICIENCY OF THERMAL RADIATION.

A paper upon the above subject was read recently before the Physical Society of London, by Mr. James Swinburne, in which the author defends the theory he put forward some twenty years ago to the effect that the efficiency of thermal radiation is a function of temperature, and attacks the commonly accepted view that at a given temperature certain surfaces possess the "convenient" property of selective radiation, in virtue of which their radiation is, on the whole, more refrangible than that emitted by a black body at the same temperature.

In the author's language, his theory is that "in the case of pure temperature-radiation, the light efficiency is a function of the surface temperature only;" "light" being taken to mean not only what affects the eye, but ultra-violet rays as well. The opposite opinion is largely based upon a paper by Mr. M. Evans in the "Proceedings" of the Royal Society for 1886. The latter paper contains an account of experiments upon the energy consumed and the light afforded by a carbon glow lamp filament before and after "flashing"—a process which changes its black surface to a grey colour; and the communication is quoted as the foundation of the theory that flashing improves the efficiency of a carbon filament. But there is nothing in Evans' experiments to show that a grey carbon is at a lower temperature than a black when running at the same efficiency; all his results being capable of explanation on the ground that a cold, black body has a higher emissivity than a grey or white substance. Professor Bottomley's experiments in the same direction are vitiated by the fact that he made no photometric measurements, depending on the eye for his estimation of the light developed. His results are also contradicted by the experiment of electrically heating a strip of platinum with a spot of ink on one side. The spot itself looks brighter than the rest of the metal; but, on the other side, the spot is dull, showing it to be colder, though emitting more light.

More elaborate tests have been made by Lummer and Jahnke, which certainly seem to show that polished platinum is somewhat more efficient than a perfectly black body. In all Lummer's experiments, the platinum was at a higher temperature than the black body, and the difference in efficiency was comparatively small. Hence it is possible that the selective emissivity of platinum is not proved. Moreover, if the existence of a body possessing selective emissivity be admitted, at a given temperature the body may be imagined either to emit the same rays as a black body at a higher temperature, or to give out the same radiation as far as short wave-lengths go, but a smaller quantity of long wave-lengths than a black body at the given temperature. Such a theory, however, would tend to make grey carbon and platinum inefficient; a black body being the best, because it is most absorbent of light and a bad absorber of heat when cold—although it does not follow rigidly that a good absorber when cold must of necessity be a good emitter when hot.

The Theory of Mantles.

It is often said that the oxides composing an incandescent gas-mantle are endowed with the power of selective radiation, and that the cerium, changing backwards and forwards from its lower to its higher oxide, produces a higher temperature than that of the direct combination (combustion of the gas?). But so far as this last point is concerned, the energy developed is the same whether ceria is present or not; and therefore if the presence of ceria cause a higher temperature to be produced when the amount of energy finally liberated is the same, energy must have been created. In other words, ceria cannot add energy continually; so that the final temperature of combustion cannot be altered by any rapidly alternating changes of the ceria. It is also necessary to observe that determinations of flame temperatures carried out by means of thermo-couples are of necessity entirely wrong. The part of a gas-flame which plays on a mantle has a temperature much above the melting point of platinum. A bunsen flame will only heat a 2-inch ball of platinum to a low red heat; whereas it will raise a thermo-couple to a yellow heat, and will melt or even volatilize a still finer wire. The comparatively coarse wire of a thermo-couple radiates heat so rapidly in proportion to the heat absorbed that it keeps comparatively cool.

The illuminating power of an incandescent mantle, according to Swinburne, admits of very easy explanation, on the ground that white bodies possess less emissivity than black. When a small body is immersed in the flame, it increases in temperature until it radiates as rapidly as it absorbs heat; and the rate of absorption depends on the difference in temperature between the body and the gas, while the speed of radiation depends on its emissivity and its temperature. If the emissivity is increased, the body radiates more heat when maintained at the same temperature, and therefore requires a larger intake; but a greater intake would demand a greater difference in temperature between the body and the flame, and, accordingly, the temperature of the body would fall until the radiation and absorption balanced at some lower temperature. A body possessing no emissivity would be at the temperature of the flame, but would, of course, yield no light. If the emissivity is very small, the body will be nearly as hot as the flame, and will emit a little light of high average refrangibility; while as the emissivity increases, the light increases, but becomes redder (until the body is no longer luminous), because the body must fall to a temperature at which the intake of heat is sufficient to balance the output. A black mantle is only red hot, and a mantle of "perfectly black" material would be duller still. As the temperature of the flame is not high enough to give a light much whiter than that wanted from the mantle, there is not much margin; for as soon as the mantle is emissive enough to give light in proportion to the gas consumed, the luminous part of the radiation begins to decrease.

It is not because ceria has any special properties, or forms two oxides, that its presence is important in a mantle; its value depends on its being a coloured body. Zirconia, thoria, and alumina by themselves give very little light; but when a coloured body, such as an oxide of the yttria group, is introduced, the emissivity increases. Any coloured body will serve that does not evaporate. When alumina is used in conjunction with chromium oxide, the latter, being in the free state, at first gives a mantle which is green when cold, and so is highly emissive. But it yields a useless red light. Afterwards the chromium oxide combines with, or dissolves in, the alumina, and the mantle becomes pale ruby pink. The emissivity thus decreases, and the mantle is enabled to become usefully luminous.

It is necessary to remember that the utility of a mantle does not depend in practice on its illuminating power alone. Makers have to study toughness, durability, flexibility, absence of shrinkage, price, and sometimes rival patents. The oxides must not be quite white. If the threads are very fine, the heat absorption is improved, and the mantles will therefore bear more ceria and greater emissive power. But the fine threads make the mantle less durable, and decrease the total radiating surface, unless the number of fibres is raised to a point at which the flame is impeded. Too high a temperature in the flame causes the ceria to volatilize and the light to fall off. Mr. Swinburne holds that the technical practice of making mantles demonstrates that oxides radiate merely because they are hot and have a reasonable emissivity; the emissivity being raised, and the temperature consequently lowered, to the point which gives the maximum light. The Nernst electric lamp was at first supposed to show the high efficiency it does because the oxides used were specially efficient radiators; but there is no evidence to show that its efficiency is not simply due to its being very hot.

CYANOGEN IN COAL GAS.

In the course of an article published a few weeks ago in the "Journal für Gasbeleuchtung," Dr. A. Samtleben, of Bernburg, discusses the manner in which cyanogen compounds are formed during the carbonization of coal, and the way in which the cyanogen is removed from the gas by an oxide purifier.

Cyanogen Removal.

Bernburg Gas-Works were built some two-and-a-half years ago. The plant comprises no special washer for the cyanogen; so that the bulk of this impurity is extracted in the ordinary purifiers, while the residue remains in the town gas. When the telescopic holder had been in use for about two years, it began to exhibit blue spots and markings at those parts of the plates which were most frequently in contact with the sealing water; some of the plates being stained blue or grey over a quarter of their area. The deposit partly assumed the form of wart-like growths, but elsewhere it was soft, and could be either scraped or washed off. Although the substance proved on analysis to be a high-grade Prussian blue, no real harm had been done to the plating; and evidently the deposit had been formed at the expense of the paint on the holder, which was said to contain some 10 or 15 per cent. of iron. During the two years of its lifetime, the holder had passed about 99 million feet of gas. The tank held 550,000 gallons of water, which was found to contain 0·947 grain of hydrocyanic acid per gallon, or 74·4 lbs. in all; and on the assumption that the amount of hydrocyanic acid in the gas was 109 grains per 100 cubic feet, the tank must have retained about 0·5 per cent. of the cyanogen produced. An analysis of the air-dried spent oxide used during the first year of working the plant showed it to contain 3·65 per cent. of Prussian blue, 0·27 per cent. of sulphocyanic acid, 35·51 per cent. of sulphur, 1·35 per cent. of sulphuric acid, 0·59 per cent. of total ammonia, and 8·32 per cent. of ammonia. The small quantity of ammonia and of sulphocyanic acid proved that the purification process had gone on normally, and that as the bulk of the ammonia had been removed in the scrubber, the sulphocyanogen had not been formed at the expense of the blue. This seemed to suggest that the greater part of the hydrocyanic acid had passed the purifier, in spite of the statements as to the removal of cyanogen made by Dr. Leybold and Herr Nauss.

In order to see what amount of cyanogen remained in the town gas, experiments were carried out over a period of four months. The quantity of hydrocyanic acid in the gas was found to vary from 3·1 to 15·1 grains per 100 cubic feet; the average being 7·18. A further series of tests was next instituted to ascertain the amount of cyanogen in the gas before and after the purifier. The quantity of hydrocyanic at the purifier inlet ranged from 62·8 to 131·5 grains per 100 cubic feet; and the proportion removed by the oxide varied

from 81·9 per cent. to 96·5 per cent.—the mean being 92·5 per cent. Before these experiments were concluded, the oxide was exhausted in regard to sulphur, and it had therefore to be replaced by a fresh charge; but no important difference in efficiency as a remover of cyanogen compounds was observable between the new and the old material. The very satisfactory degree of removal of the hydrocyanic acid by the oxide must be attributed to the low speed at which the gas passed through the purifying vessel. The spent oxide weighed 95,000 lbs., and had treated about 50 million feet of a gas very rich in sulphur. On the basis that the crude gas only contained 87 grains of hydrocyanic acid per 100 cubic feet, and that the average amount recovered in the purifier was only 85 per cent., the spent oxide should have contained about 6·3 per cent. of blue—*i.e.*, much more than the 3·65 per cent. which it actually did. It has not been possible to determine exactly in what manner this deficiency in blue has been brought about; but since at the time when the Bernburg works were started 2 per cent. of air was added to the gas before entering the purifier, Dr. Bunte's explanation may serve. According to him, even when the theoretically correct proportion of air is added to the gas, the purifying material begins to suffer from lack of moisture before it is exhausted, and then revivification does not proceed at an equal speed to the absorption of sulphuretted hydrogen, but a portion of the atmospheric oxygen passes through the purifier without taking part in the reactions. In any case it seems desirable to lower to a minimum the proportion of air employed, whenever it is wished to reduce the quantity of cyanogen in the purified gas and to increase the amount of blue in the spent oxide.

It is worth observing that the analytical method of determining the cyanogen in the gas after purification, by the formation of sodium ferrocyanide, occasionally fails. In some of the experiments where air was in excess, precipitation with iron alum did not yield the ordinary precipitate of Prussian blue, but a reddish-blue substance which settled badly, assuming a colloidal condition, and rendering filtration difficult or even impossible. The precipitate is decomposed by normal caustic soda; but is not formed again on treatment with acid. The anomaly is still under investigation.

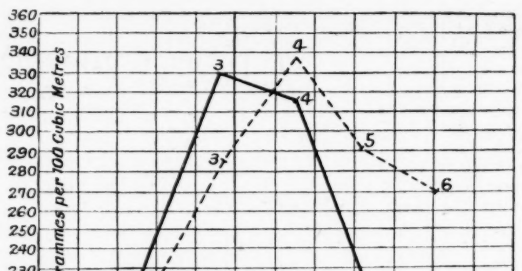
Formation of Cyanogen in the Retort.

With the object of ascertaining at what stage of the carbonization of coal cyanogen compounds are formed, Dr. Samtleben has carried out tests with English and Saxon coals. The former was a Yorkshire silkstone, and the latter nuts from *Z*wickau. Their constitution was as follows:—

	English Coal.		German Coal.
Fixed carbon . . .	58·49 per cent.	..	51·02 per cent.
Volatile matter . .	31·36 ,,	..	37·02 ,,
Water	3·23 ,,	..	6·61 ,,
Ash	6·92 ,,	..	5·35 ,,

The ascension pipe from the left upper retort of a nine-retort setting was drilled for a 1-inch pipe, which was carried up over the hydraulic main, and fitted with a rubber connection. With the aid of a water-pump, gas was aspirated at the rate of about 75 litres per 45 minutes through this pipe, through a tube filled with cotton wool to remove tar, through an empty flask to act as a condenser, into an absorbing vessel charged with alkaline ferrous sulphate solution, and then through an experimental meter. The time occupied in changing the cotton wool filter and in emptying and refilling the absorbing vessel, was about 15 minutes; so that a complete test of the amount of cyanogen compounds in the crude gas could be made for each hour of the carbonization process. The preliminary experiments showed that with a certain variety of coal, the quantity of hydrocyanic acid formed depended on the temperature, on the size of the lumps, on the weight of the charge, and on the amount of moisture present in the coal. Hence, as the Saxon coal was in nuts, the English coal was broken to the same size, the charge of each was always 400 lbs., and the carbonization was made to extend over six hours.

Two tests were carried out with each coal—one at a bright red heat estimated at about 950° C., the other at a dark orange heat estimated at 1050° C. The general results are indicated in the annexed diagrams, where the full lines represent the evolution of hydrocyanic acid at the bright red carbonizing temperature, and the dotted lines that at the dark orange temperature. The figures within the diagrams indicate the results of each six consecutive analyses. The abscissæ are hours and half hours; the ordinates are grammes of hydrocyanic acid per 100 cubic metres of gas, which may be converted into grains per 100 cubic feet by multiplying by 0·437. The absolute quantities of hydrocyanic acid evolved during these four tests varied considerably, as might be expected; but there is a general similarity between the qualitative results. It is noticeable that the low temperature curve has a much steeper form with the Saxon coal than with the English material; the maxima being in both cases shortly after the second hour of carbonization. At the higher retort temperature, evolution of cyanogen compounds does not increase so rapidly with the Saxon coal as with the English; but the maxima are again to be found at an identical stage of carbonization—viz., shortly after the completion of the third hour—an hour later than at the lower working temperature. In general, it may be said that the production of cyanogen compounds culminates with the first half of the carbonization, in a six-hour run. The rule would presumably apply to all kinds of coal; but with a higher retort temperature, it should show a somewhat later maximum—*i.e.*, during the fourth hour.



English Coal.

Saxon Coal.

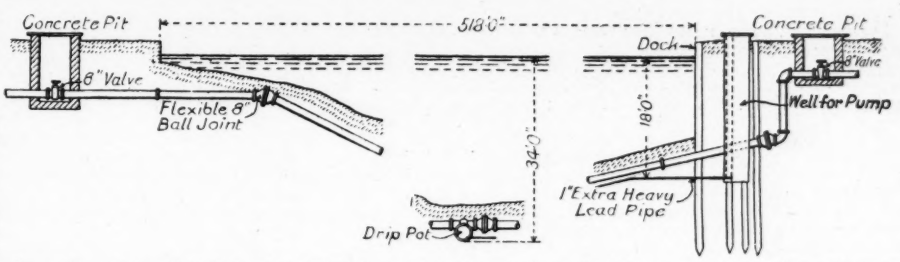
LAYING A SUBMERGED GAS-MAIN.

In the course of last summer, an 8-inch gas-main was laid under the Fox River, from Oshkosh to South Oshkosh (Wis.), for the Oshkosh Gas Company; and some particulars in regard to the work have been given in "Engineering Record."

The river is 525 feet wide, has an average depth of 24 feet, and carries from 375,000 to 625,000 gallons of water per minute, with a fairly swift current even at low stages. The 8-inch main replaced an old wrought-iron pipe, and it will supply South Oshkosh from a low-pressure coal-gas plant. The old main had been badly corroded by the action of the acids produced from an unusual quantity of cinders which reach the river. The new one is made of standard cast-iron spigot-and-socket water-pipe, with lead joints. Every third joint was made a flexible one, to facilitate the laying, and to permit the main to adjust itself to the bed of the stream. Owing to the location of mains on either side of the river which had to be connected, and to the right-of-way obtainable, the submerged main is laid at an angle with the banks of the river. The general arrangement is shown in the illustration on next page. The bottom of the river at the middle of the stream is rock overlaid with 18 inches of very soft silt. The depth at the middle is about 34 feet, which decreases considerably

towards the sides; the gravel being covered by the same silt which covers the rock at the middle.

A trench was cut through the silt by means of a hydraulic jet handled by a diver. The jet was supplied with water under a pressure of about 140 lbs., by a pump upon a scow that was anchored over the point where the work was in progress. An ordinary firehose nozzle, with a ½-inch opening, was used with good results. The joints between three 12-feet lengths of the pipe were made on the scow; and a flexible joint was made at the same time on each of the sections of the main composed of the three lengths of pipe. The scow was anchored just over the position that each section thus assembled was to occupy, and the section lowered into place by a stiff-leg derrick. The section was supported by chains at two points, one just beyond each of the two joints between the lengths of pipe, in such a manner as to keep it horizontal during lowering. The joints are of the ball-and-socket type, with bolted flanged connections and lead gasket between the flanges.



When a section of the main was lowered into its place on the bottom of the river, the flexible joint on the end next to the pipe already laid was made by a diver, who formed the lead joints with a pneumatic hammer fitted with a caulking tool. The joints made on the surface were also caulked with the same tool; air power being supplied by a compressor on the scow. The rock came so close to the surface of the bed of the stream near the middle of the crossing that the pipe had to be anchored to it to ensure safety against displacement. Holes were made in the rock on both sides of the pipe, with a pneumatic hand drill, by the diver. Expansion bolts were placed in these holes, and strips of iron passing over the pipe attached to the bolts. After the pipe had been laid, the trench opened by the hydraulic jet was soon closed up with silt by the river. The submerged main is provided with a gate-valve at each end on shore, in order that it may be cut out of service. A connection with an air-compressor is also provided on the river side of one of these valves, permitting the main to be tested for leaks. After the laying had been finished, these gate-valves were closed, and air under 60 lbs. pressure was turned on to test the joints. Whenever leakage of air occurred, the diver went down and re-caulked the joints.

A 12-feet length of 16-inch pipe, blanked at one end, and attached by a flexible joint to the 8-inch main, was placed transversely at the lowest point in the latter, about 200 feet from one shore, to receive whatever condensation might occur. A 1-inch extra heavy lead pipe is laid from this condensation collector to a well on the shore. This well is made of two lengths of 36-inch cast-iron pipe set on end, and blanked at the bottom. The pipe-well stands on piles, and is kept vertical by four guide piles. The bottom of the well is 18 feet below the normal river level and 16 feet above the bed of the river at the length of the transverse 16-inch pipe. The contractors guaranteed leakage, including condensation, not to exceed 4 gallons per 24 hours. An actual test after the main was completed showed the leakage and condensation to amount to 2·75 gallons per 24 hours. A hand pump in the bottom of the well on the shore has sufficient capacity to remove this quantity of water; the suction lift being reduced to reasonable working limits by the well. Lead pipe was used to make the connection between the length of pipe in which the leakage and condensation are collected and the well on the shore, on account of the corroding action of the river water on the wrought-iron pipe.

REGISTER OF PATENTS.

Recovery of Pyridine.—Lessing, R., of Connaught Street, W., and Wilton, T., of Beckton. No. 4766; March 7, 1905.

Pyridine and similar bases are, the patentees point out, at present manufactured exclusively from coal tar or bone oil, which have hitherto been regarded as the only products of the gas and other industries from which they can be profitably prepared or recovered, although it is known that traces of them are usually found in the ammoniacal liquor and ammonium salts obtained as bye-products in the manufacture of coal gas.

The present invention is based upon their discovery that pyridine and similar bases can be prepared practically, and with substantial profit, as a bye-product in the ammonia industry; and it may be carried into effect in various ways, of which the following may serve as examples.

According to one method, the crude ammoniacal liquor may be pumped through a washer charged with an oil capable of absorbing the pyridine and similar bases, while leaving the ammonia substantially unabsorbed—for example, heavy tar oils may be employed. The bases are taken up, and may be subsequently extracted from the oil in any convenient way.

With the method just described, a comparatively large quantity of gas liquor has to be dealt with; for which reason the process would be in general more capable of employment in small plants than where a great bulk of liquor is handled. In the case of larger ammonia works, it is, of course, desirable to deal with a relatively less bulky material, wherein the bases are accumulated to a greater extent, or are contained in larger proportion than in crude gas liquor. They therefore prefer in general to adopt methods such as those they next describe.

As the result of practical investigations, they have found that, under the usual conditions prevailing in the saturators of sulphate of ammonia plant, the bulk of the pyridine and similar bases present is not retained by the acid in the saturators, but is carried away with gases emanating from the ammonia saturators, and collected mainly in the aqueous condensate from the gases. They prefer therefore to treat these gases, or the aqueous condensate therefrom, for the recovery of the pyridine or similar bases, by passing them through a washer containing a suitable oil adapted to absorb the bases, and from which the latter may be extracted or worked up in any convenient way.

For the purpose of recovering the bases from the condensate of the waste gases, this may be treated with the oil in a washer or vessel, and the bases afterwards extracted therefrom. Among other oils which may be used in the washer for the waste gases or condensate, the tarry matters deposited with the condensate from the waste gases in cooling are said to be very suitable, as a certain percentage of phenols contained in the absorbing oil helps towards complete removal of the bases from the gases or condensate.

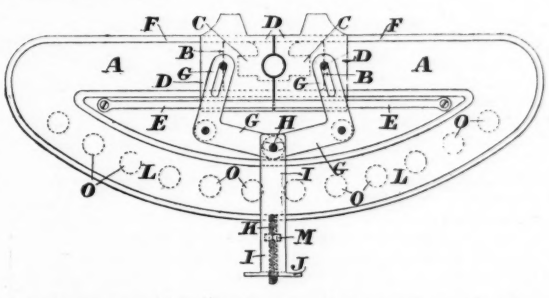
According to another method, they pass the waste gases through a washer or scrubber, where they are subjected to the action of sulphuric acid, whereby sulphuric acid salts of the bases are obtained. Or the aqueous condensate may be treated with acid, and the solution evaporated down to a convenient strength. In either case, the resulting acid solution is carefully neutralized with ammonia or alkali, when the bases separate out and are drawn off. Or the aqueous condensate, which still generally contains traces of ammonia, may be re-distilled in an ammonia or other still; the distillation gases being received in sulphuric acid, which is kept in excess. The bases can be recovered as above, by carefully neutralizing the acid solution.

According to these methods, if ammonia is used for neutralizing, the solution of ammonia sulphate remaining after separation and removal of the bases will be available for further use—thus reducing the working expenses.

Burners for Gas-Fires, Gas Cooking-Apparatus, &c.—Ransome, J. A., of Lymm; Burnett, J. R., of Latchford, and the Richmond Gas-Stove and Meter Company, Limited, of Warrington. No. 10,055; May 13, 1905.

This invention has for its object to provide means for regulating the quantity of air supplied to bunsen or atmospheric burners, so as to adapt them for burning either coal gas or water gas, or other gas of a similar nature to water gas, either alone or in conjunction with ordinary coal gas, and at the same time prevent firing-back of such burners when lighting them.

As applied to horizontal burners—such as are used in gas-fires, or in gas heating or cooking apparatus—there is used in connection with the openings by which the air is admitted to the mixing tubes or conduits a slide or slides, by which these air-openings can be partially or wholly closed, and such slides operated from the front through a push-and-pull device, which, in operating upon levers, cranks, or the like, moves the slides, so as to partially close or open them. In the case of water gas being the heating agent used, less air is required to cause perfect combustion; and the air-apertures will be partially or wholly closed to suit this case. When coal gas or analogous gas is used, then the slides are moved away, so as to wholly uncover the air-openings, which (say) are of such a size or regulated area that, when they are open, they will supply the quantity of air necessary for the complete combustion of the gas.



The illustration shows a plan (viewed from below) of a burner according to this invention—the type or general form commonly employed in gas-fires.

A are the mixing-tubes of the burner, which, on the upper side, are in one continuous piece, but below, at the centre part, are provided with openings, of which the dotted line B represents the end. At

these openings, the nipples C, for the gas supply, are disposed; and from them the gas is directed along the axes of the tubes A in the opposite directions. These openings may extend for about half the depth of the tube A. The slides referred to are designated D, and work in connection with the air-openings; they being in the position shown, completely closed, and practically meeting at their inner edge, and shutting off the air to the burner completely.

The slides are supported at their inner edges by a bar E, fixed at its ends to the burner, and at the outer edges by the ribs F, formed on the outside edge, and at about the centre of the tubes A, round which they are bent. Their edges thus rest on the top of the ribs F; while the inner edges of the slides are also bent over and downwards, so that these bent-over portions will lie over the upper part of the bar E. Thus the slides are supported at each edge, and are adapted to be moved to and fro in relation to the air-inlet apertures of the burner upon their supports—namely, the bar E and the ribs F.

The slides are operated by the two bell-cranks G, hinged on the underside of the burners, and provided at their outer ends with slots, through which pins on the slides pass. The inner ends of the bell-cranks are brought together as shown, and overlap, and are provided with slotted apertures, through which a pin H, fixed in the bar I, passes.

This bar is the operating means (the push-and-pull part) of the device—that is, the part which is moved by the hand, and through which the slides are moved and set to their required positions. For convenience, the bar at its outer end is turned up at J, in the form of a handle or catch to be grasped, and is supported by a pin K, fixed on the outer side of the burner nozzle tube L, and passing through the handle.

The pin K, beyond serving as a guide and support to the push-and-pull device I J, also serves as an adjusting means. It is threaded; and upon it there is a nut M, which serves as a stop to the bar I and device generally, so that when the push-and-pull device is (say) pushed in—by which action the slides D are pushed apart for opening the air-inlet apertures of the mixing-tubes—the plate or device I J will be stopped, and the operator or user will know that the air slides or shutters D have been moved to the proper position. The nut M, of course, has to be adjusted to suit the particular gas requiring a certain amount of air for its complete combustion. Conversely, when the bar I is pulled out, the slides or shutters D will come up close to one another, or to the required point, as shown.

When lighting the burners, if the slides D be closed, so as first to shut off the air by the apparatus, and the gas be lighted at the burner-nozzles O, the gas will burn as an ordinary burner—*i.e.*, not as an atmospheric burner. Then, by opening the slides D by the push-and-pull bar or device I J, the air in proper proportion will be supplied to the gas being delivered and passing along the mixing-tubes A. The burner will then burn as a bunsen or atmospheric burner, and will not fire-back.

Retort-Discharging Machine.—R. Dempster and Sons, Limited, and Mitton, W., of Elland. No. 13,054; June 24, 1905.

For discharging gas-retorts, the patentees propose to provide a telescopic ram in which the extensible parts lie one within the other in such manner as to permit of water being contained in the intervening spaces, so as to cool them; and the extensible parts are actuated by means of a creeper chain or chains, or the like, having teeth or catches arranged in pairs at suitable intervals apart. These catches come into contact successively with one after another of a series of pins, bars, or projections, placed at the hinder end of each of the extensible parts, so as to push same forward and make it enter the retort, and by the reversal of the chain's movements to draw them back when the stroke is completed. Each pair of catches may be so arranged that, in the forward movement, the first tooth or member of the pair passes clear of the projection on the rake, while the second member engages it; and in the return movement, the first tooth engaging the other side of the projection serves to collapse the ram. When the first portion of the ram is entirely extended, an automatic catch comes into action and locks it to the second portion. Therefore the first and second portions will be as one; and so on with every successive length. When the ram is collapsing, these catches are automatically unlocked when each separate portion of the ram has been returned to its place of rest.

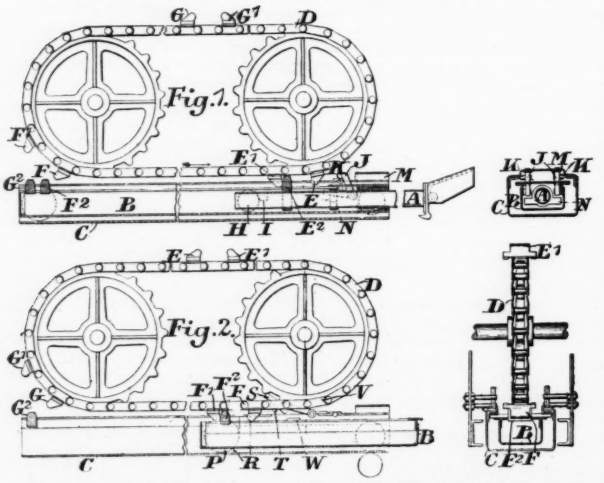
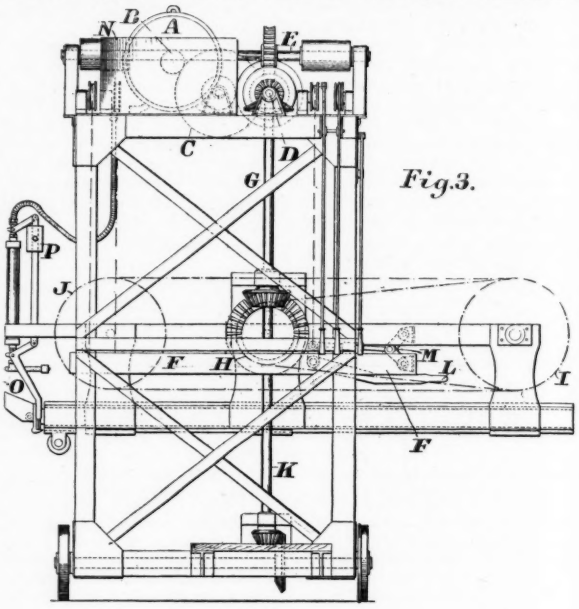
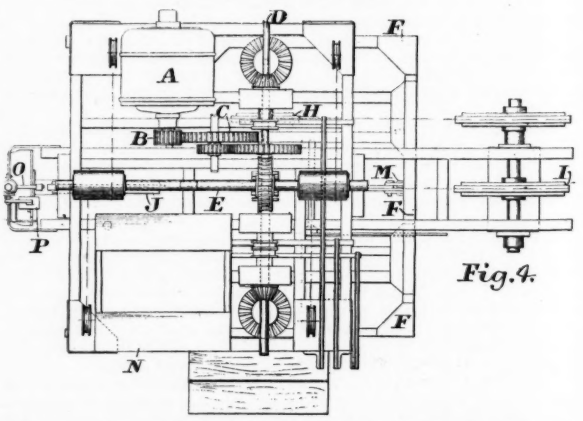


Fig. 1 is a sectional elevation of the ram comprising three lengths, and a chain—showing the first length at or near the end of its stroke when extending. Fig. 2 is a similar sectional elevation showing the second length at the end of its stroke. A cross section and an end elevation of parts is also shown. Fig. 3 is a side elevation of a complete machine. Fig. 4 is a plan of the machine.

In fig. 1, letter A is the first extensible portion, carrying the ram-head; B the second; and C the third length. The chain D carries three pairs of teeth or catches, each adapted to engage a tooth or projection on one of the telescopic lengths F G. When the chain is first set in motion in the direction of the arrow, the catch E is already in front of the tooth E^2; but the catch E^1 engages the tooth, and thereby pushes forward the first length A, causing it to protrude further out of the second length B, until the roller H on the hinder end of the length A reaches the stop I on the length B, and begins to draw forward the length B out of the length C. The second pair of catches F F^1 are timed to come into action at this point; the catch F passing over the tooth F^2, and the catch F^1 engaging the tooth (which has now been drawn into the path of the catch by the extension of the length A as mentioned), so as to continue the advance of the length B. The hook catch J, fixed to the length B, is now carried clear of the peg or tappet K, and strikes the projection M, both fixed to the third length C, so that this hook J falls over the snug N on the first length, and prevents any backward movement of the length A within the length B—the roller H and stop I acting in the opposite direction, so that the lengths A and B move as one.

The locking together of the second and third lengths is effected in a





similar manner by the action of a roller P, stop R, hook catch S, tappets T and V, and snug W, as shown in fig. 2; and similar arrangements may be applied to the third length.

On reversing the movement of the chain D, the catch G^1 remains clear of or behind the tooth G^2, and the catch G engages the tooth to draw back the length C. The catches F^1 and G^1 clear the teeth F^2 and E^2 in consequence of the movement of the length C, and the catches F and E draw back the lengths B and A; the tappets K and T disengaging the catches J and S from the snugs N and W respectively.

Referring to figs. 3 and 4, the power for operating the machine is shown as obtained from a motor A at the top. A pinion B (preferably of raw hide) on the motor shaft drives a spur wheel C, on the stud or shaft of which is mounted a pinion driving a wheel on the cross shaft D. This shaft transmits motion by the worm and a worm wheel to a longitudinal shaft E, on which are drums or chain barrels. On these drums are wound cords or chains passing over pulleys to the sliding frame F, for lifting and lowering the ram and chain. At one end of the shaft D are bevel gears to a vertical shaft G, driving by bevels the shaft of the chain-wheel H. This wheel, by means of a chain, drives a wheel on the shaft of the chain wheel I and this wheel drives the working chain passing around the carrier wheel J. At the other end of the shaft D, bevels, rotating a vertical shaft K by bevel gears, rotate the axle of one pair of wheels to traverse the machine along the rails.

The framework may be so balanced that its normal position is parallel to that of the slide F on which it is hung; but by raising or lowering the hinder end of the framework relatively to the slide, the ram-head will be depressed or elevated—thus facilitating its use as a rake. By pressing down the handle L, the toggle levers M are opened out, so as to lift the wheel I and lower the ram-head; while by lifting the handle the levers are caused to draw the top of the frame down towards the slide F at the points of attachment of the levers, and so tilt the ram-head upwards.

A tank N supplies water to a sprinkler O, which sprays the ram-head on its withdrawal. The water for each sprinkling is contained in a cylinder provided at the top and bottom with valves. When the ram is extended, a weight P causes a lever to close one valve and open another, so that the cylinder is filled; but on the collapse of the ram, the head engages the first lever, lifts the weight, closes the second valve, and opens the other one, so that the supply to the cylinder is cut off, and the cylinder discharges through the sprinkler O.

Coin-Freed Apparatus for the Supply of Gas.—Tourtel, J. M., of Queen Victoria Street, E.C. No. 13,430; June 29, 1905.

The principal features of this invention are—

(1) The apparatus is so constructed that the price-changing mechanism can be altered from being a "pointer-and-scale" price-changer to a "change-wheel" price-changer without disturbing the rest of the mechanism.

(2) The "pointer-and-scale" price-changing mechanism is so constructed that an operating pawl travelling around a rachet-wheel is, during its revolution, arranged to engage with, and disengage from, the ratchet-wheel in such a manner that the distance through which the ratchet-wheel is turned can be accurately set without difficulty and without any possibility of the operating-pawl turning the ratchet-wheel through a different distance from that for which the mechanism is set; this result being obtained by the design and construction of the apparatus, and by the particular method of engagement and disengagement employed.

(3) The measuring-out mechanism consists of an epicyclic gearing constructed in the following manner: A spindle (called the "measuring-out spindle") has secured to it a cradle supporting two mutually meshed pinions so arranged that one of the pinions gears with a wheel upon one side of the cradle, while the other pinion gears with a similar wheel on the other side. Both wheels are mounted on sleeves placed upon the measuring-out spindle and free to rotate on it. One of the wheels is actuated by the coin-operator, thus turning the cradle and measuring-out spindle in one direction; the other wheel is driven by the meter train, and turns the cradle and measuring-out spindle in the reverse direction.

(4) The coin-operator consists of a spindle provided with a longitudinal pocket to receive the required coin, a locking lever to prevent rotation of the spindle when no coin is present, a flange around the coin-pocket to support the locking-lever, and a ratchet-wheel secured to the spindle and engaging with a fixed pawl to prevent rotation in the wrong direction. When a coin is present, a very small angular movement of the coin-pocket enables the coin to lift the locking lever and release the mechanism; whereas in other coin-operators of a similar type (such as that described in the present inventor's patent No. 8644 of 1896) a large angular movement is said to be necessary.

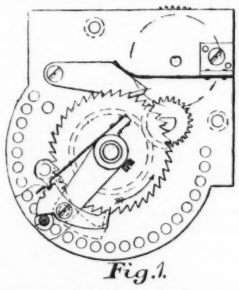


Fig. 1.

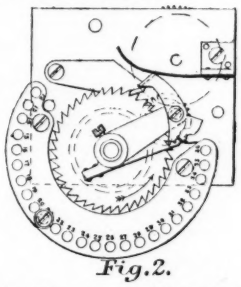


Fig. 2.

The construction of the apparatus is shown in the illustrations: Fig. 1 is a front elevation of the apparatus provided with a "pointer-and-scale" price-changer, and showing the operating pawl about to disengage from the measuring-out ratchet-wheel. Fig. 2 is a similar view showing the operating pawl about to engage with the measuring-out ratchet-wheel. Fig. 3 is an end view of the apparatus, with one of the pillars removed. Fig. 4 is an end elevation; and fig. 5 is a plan of the apparatus provided with change-wheels for price-changing and showing the apparatus attached to a dry gas-meter and connected to the supply valve.

The framework consists of two parallel plates secured together by pillars; and three spindles are mounted in the framework. The first spindle (bearing the coin-operator previously described) is provided at its extremity with an operating-handle and with the means already described for locking the spindle and for permitting a coin to release the spindle and allow it to be turned one complete revolution. The second spindle, which is provided with a pinion, projects through the framework and bears a removeable wheel which gears with a similar wheel upon the first or operating spindle. The third or measuring-out spindle has been previously described, as well as the two sleeves centred upon it. A wheel on one of the sleeves meshes with the pinion of the intermediate spindle, while the other sleeve is connected by gearing to the meter-index. The measuring-out spindle projects through the framework at each end, and one extremity bears a dial or pointer to indicate the amount of gas prepaid but unconsumed; while the other extremity bears a lever, cam, or equivalent device for operating the gas-supply valve.

When a "change-wheel" price-changer is required, it suffices to change the wheels connecting the operating and intermediate spindles—each of the wheels being suitably secured to its spindle. When a "pointer-and-scale" price-changer is required, the wheel on the intermediate spindle is alone secured, while the wheel on the operating spindle is free to rotate upon the spindle; and this latter wheel has secured to it a rachet-wheel. Upon the operating spindle is secured an arm carrying an operating pawl adapted to be turned a complete revolution around the rachet-wheel for each coin inserted in the apparatus. Soon after the commencement of its revolution, the operating pawl is suddenly brought (by a spring or its equivalent) into engagement with the rachet-wheel; and this engagement takes place always at the same fixed point. At a subsequent and alterable point in its revolution, the operating pawl is suddenly released from engagement with the rachet-wheel; and the distance between the alterable point and the fixed point determines the quantity of gas prepaid for each coin inserted.

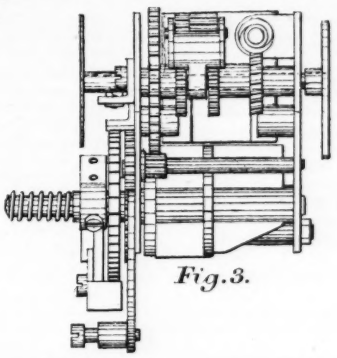


Fig. 3.

A tail-piece or equivalent of the operating pawl is provided with two notches or the like, with which engages a spring or equivalent secured to the arm, and which spring retains the operating pawl in the respective positions of engagement or disengagement. The tail-piece is arranged to strike a removeable projection fixed to the framework of the apparatus, or upon a plate secured to it, and to strike in such a manner that the operating pawl is suddenly and forcibly removed from engagement with the ratchet-wheel during a very small angular movement of the operating-spindle.

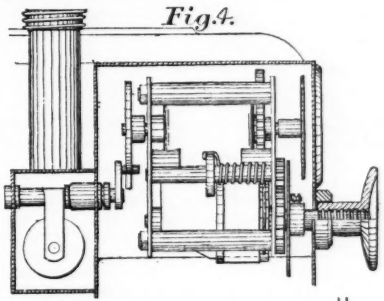


Fig. 4.

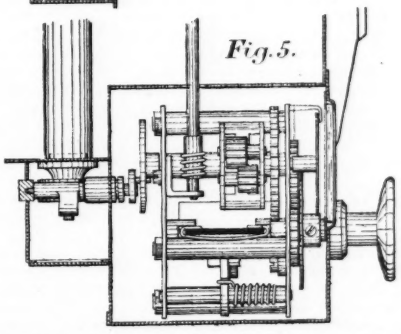


Fig. 5.

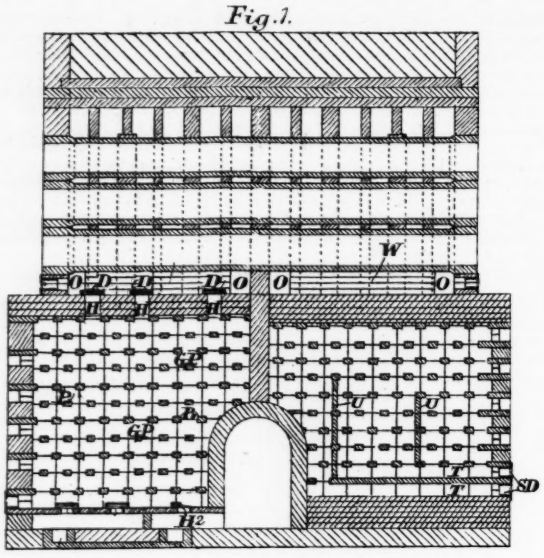
A non-return pawl, pivoted upon the framework or upon the plate, engages with the teeth of the ratchet-wheel and prevents any backward motion; and the pawl is so positioned that the operating pawl is enabled to pass over it, and is then pressed down upon it by the spring which brings the operating-pawl into engagement with the ratchet-wheel. By this means, the operating-pawl is forced into engagement with the ratchet-wheel without the possibility of jumping a tooth.

Regenerative Furnaces.—Brown, J. H., of Nottingham. No. 20,318; Oct. 7, 1905.

This invention consists in improvements in the construction of the gas and air passages of regenerative furnaces, in the manner by which the gases are controlled by damper tiles placed at the various positions in the gas-passages on their way to the chimney, and in the construction of bottom flues by means of which the waste gases, before entering the chimney, may be utilized in raising the temperature of the water in the ashpit.

Fig. 1 (p. 450) shows a longitudinal section through the furnace; the half on the left-hand side being a section of the waste-gas passages, and the half on the right-hand side being a section through the secondary-air passages. Fig. 2 shows the furnace in elevation in the right-hand half and in section in the left-hand half through the gas and air passages. It also shows the top and bottom dampers and bottom flues. Fig. 3 is a longitudinal section through the furnace grate.

Fig.1.



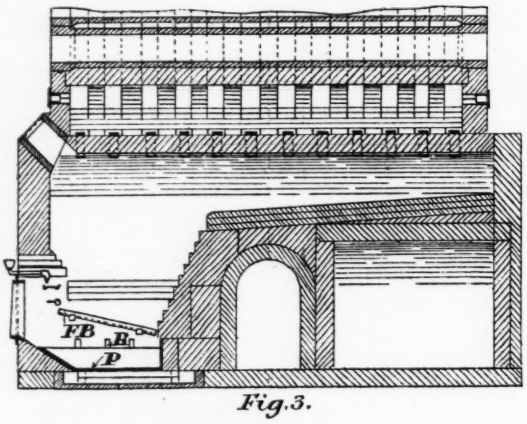
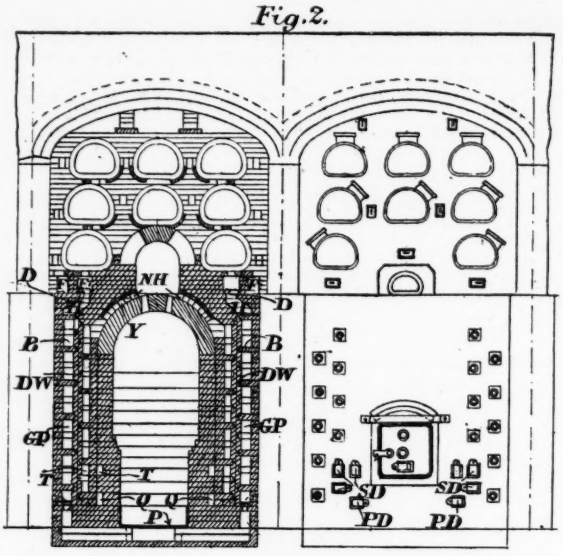


Fig.3.

Fig.2.



The passages for the waste gases are shown in figs. 1 and 2. The gases from the furnace, after passing upwards from the combustion chamber and heating all the top retorts, travel down the extreme outside of the outer retorts into the flues F, and from each of these, through the two openings O of the division wall W, under the bottom retort, into the flue heating the underside of the retort. From this flue the gases are caused to pass, through the three holes H in the bottom of the flue (see fig. 1), into the waste-gas passages G P. The holes have damper tiles D placed over them, so that the quantity of gas passing through any one of them can be regulated by setting the dampers through the furnace door by means of an iron bar. By this arrangement, the gas is "caused to travel towards the centre or front of the setting and an even heat maintained throughout the whole length of the setting." The gases then pass in a downward direction along the waste-gas passages G P, coming into contact with the baffle-bricks B, and heating them and the division wall D W between the gas and air passages until the gases reach the bottom. They are then caused to pass through holes in the bottom into flues regulated by damper-tiles, by the opening or closing of which the gases are caused to be drawn either to the front or centre of the setting; thus spreading the hot gases on their downward travel over the whole surface of the division wall D W. The greater part of the gases then travel to the main flue through a flue which runs under the ashpit P. The gases heat the water in the ashpit and convert it into steam, which, rising up under the fire-bars F B, comes into contact with the fuel of the furnace and combines to form water gas. The steam thus formed also "prevents the fire-bars from being burnt, loosens the clinker on the bars, and makes the clinkering much easier." The remainder of the gases not required for heating the ashpit pass direct to the main flue.

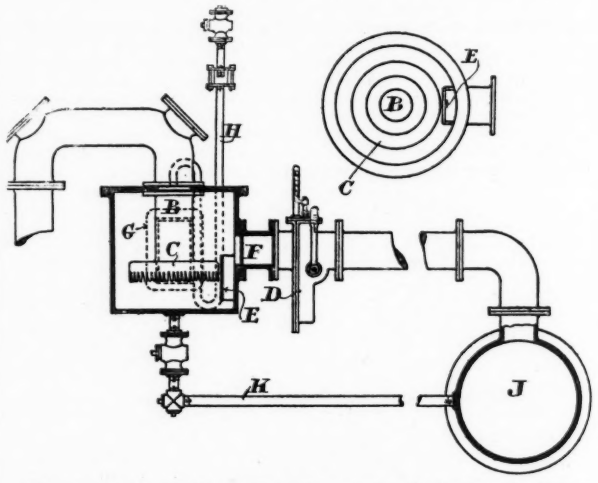
The primary air is led, through the dampers P D and flues Q, to the openings R under the fire-bars F B. These dampers and flues are placed higher up than is usual in such furnaces; and the primary air, in passing along the flues Q, which are near to the bottom of the hot division wall D W, becomes heated to a high temperature before entering the furnace under the fire-bars.

The secondary air is supplied through the three dampers S D and flues T to the secondary-air passages on either side of the furnace. The division walls U cause the cold air which is brought in to be distributed along the whole length of the setting in a number of streams, becoming heated as it rises and comes in contact with the heated division wall D W and hot furnace wall. Finally the air passes over the top of the furnace arch in a number of streams through the passages Y and nostril holes N H into the combustion chamber.

Cooling Gas Issuing from Dip-Pipes.—Wilton, G., of Mark Lane, E.C. No. 25,275; Dec. 5, 1905.

This invention has for its main object to provide means for cooling the gas issuing from the dip-pipes or the like into the hydraulic main or hydraulic chambers of coal-distillation plant, "whereby the gas is cooled to a much greater extent than hitherto in the hydraulic main or hydraulic chambers, so that a considerable economy is effected in working, and, at the same time, the deposition of heavy tars in the hydraulic main or chambers is better prevented or reduced than hitherto."

It is usual in practice, the patentee points out, to couple a number of retorts to a length of hydraulic main, and to employ a series of dip-pipes, each terminating below the water level in the hydraulic main. It has also been proposed to isolate the dip-pipe of each retort in a separate hydraulic chamber provided with a valve, whereby each retort can be cut off for opening or re-charging without affecting the other retorts, and so as to prevent the admission of air to the hydraulic chamber or the escape of gas into the opened retort. The present invention is applicable to either form of plant—that is to say, whether a continuous hydraulic main or separate hydraulic chambers be employed.



The gas entering the hydraulic main or hydraulic chambers is caused to bubble direct through a current of cooled gas liquor kept constantly flowing through the main or chambers; and by thus bringing the gas issuing from the dip-pipes into direct and intimate contact with constantly renewed quantities of cool liquor, a cooling action is exerted on the gas which "introduces a considerable economy in working, and at the same time deposition of the heavy tars in the hydraulic main or chambers is better prevented or reduced than has hitherto been possible—the greater cooling action increasing the separation of the lighter tars, which, as is known, have the property of dissolving and rendering the heavy tars in the hydraulic main more fluid and less liable to deposit." The constant stream of cooled gas liquor flowing through the hydraulic main or chambers also assists in preventing the deposition of the tars and in carrying them away.

Fitted to the dip-pipe from the retort is a serrated bubbling hood C, terminating just below the liquid level, which is determined by a sliding-valve D, having an operating handle and indicator scale. E is a shield-plate fitted about the outlet F; and G is a sight window in the side of each hydraulic chamber. H is the liquid supply-pipe, by which the constant stream of gas liquor is supplied to the hydraulic. This stream is supplied in a cooled condition by passing it through any suitable cooling apparatus. The gas bubbling from below the hood C thus comes in direct and intimate connection with a cool stream of gas liquor, and "is very efficiently cooled, as before explained." The outlet F from the chamber is continued beyond the valve D to the gas-liquor main J. K is a pipe connected to the base of the hydraulic, and fitted with a cock to draw off tar from the hydraulic into the main J.

The liquid level in the hydraulic is regulated by the valve D, so that it may be maintained at the required point. When it is required to

shut off the particular retort or simultaneously charged group of retorts connected to the chamber, the valve is raised so as to raise the liquid level and submerge the base of the pipe D to such a depth that all access from the retort to the chamber, or from the chamber to the retort, is prevented. On the retort being closed for re-working, the valve is again lowered to reduce the level to the required working conditions, which level can be at once ascertained by the indicator, and also by the window G.

APPLICATIONS FOR LETTERS PATENT.

10,011.—GIBBONS, W. P., SMITH, W., and GAY, R., "Dies for making taper gas retorts and pipes." April 30.
10,018.—DOBSON, D. B., and O'CONNOR, H., "Bye-passes for gas-burners." April 30.
10,026.—SUTTON, C. J., and RUDD, J., "Shock-proof apparatus for gas-pendants." April 30.
10,034.—COX, G. J., "Differentiating gas-meters." April 30.
10,048.—KEITH, J., "Pressure fans." April 30.
10,106.—FORBES, Sir C. S., "Carbide of calcium preparations." April 30.
10,107.—FORBES, Sir C. S., "Acetylene-generators." April 30.
10,158-9-60.—HARTENSTEIN, H. L., "Manufacture of carbide." May 1.
10,235.—THOMPSON, W. H., "Gas griller and boiler." May 1.
10,240.—COWLEY, F., and STANLEY, H. O., "Pipe-cleaner for use in gas-works." May 2.
10,254.—HUTCHINSON, C. H. & B. G., "Coin-freed gas-meters." May 2.
10,255.—STAPLES, J. C., "Gas-burners." May 2.
10,263.—OWEN, J. D., "Protecting slot-meter coins." May 2.
10,266.—POTTER, W. G., "Gas and water valves" May 2.
10,322.—RUSSELL, T. T., and NOAD, A. C., "Mantles." May 2.
10,332.—CARLEY, A. T., "Taps for incandescent burners." May 2.
10,338.—ANDERSON, D., and SCOTT-SNELL, C., "Self-intensifying lamps." May 2.
10,340.—NEWTON, H. C., "Acetylene-generator." May 3.
10,357.—RUFFERT, G., "Incandescent bodies." May 3.
10,406.—M'RAE, J., and INGRAM, H., "Gas-globes." May 3.
10,412.—KOPPERS, H., "Gas-furnaces." May 3.
10,446.—LYNDE, F. C., "Mixing gas and air." May 4.
10,460.—SKINNER, R. J., "Gas-igniter." May 4.
10,476.—CLAUGHTON, T., and WADE, B., "Gas-producing apparatus used with engines." May 4.
10,530.—SCOTT SNELL, C., "Incandescent burners." May 5.
10,564.—RYLSKI, B., and CORNU, P., "Gas-burners." May 5.
10,581.—ELWORTHY, E. G., "Manufacturing carbonic acid, hydrogen, and nitrogen." May 5.
10,615.—SIEGENBERG, L., JUN., "Inverted burners." May 5.

Death from Coal Gas Poisoning.—An inquest was held at Bournemouth last Tuesday into the circumstances attending the death of the Rev. Charles Carey, aged 90, formerly Rector of Kingweston, who was found dead in his bed. A son of deceased said that on the previous morning his attention was called to a smell of gas, which he traced to his father's room; and on going in, he found that a gas-tap was turned on. The medical evidence showed that death was due to asphyxiation by gas; and a verdict of "Accidental death" was returned.

A Prisoner Kills Himself with Gas.—Three days after being sentenced at the Old Bailey to a term of hard labour, a prisoner named Isaacs, was found dead in his cell at Wandsworth Gaol; and inquiry showed the cause to be gas poisoning. There is a gas-jet in every cell, with the tap outside; but apparently the deceased, after unscrewing the burner and blocking up the ventilator and door, managed to get his hand out and turn it on. A verdict of "Suicide during temporary insanity" was returned; the Foreman of the Jury expressing the opinion that more care ought to be exercised to prevent such an occurrence.

Gas Explosion at Nottingham Castle.—Last Thursday, while a party were being shown round the dungeons at Nottingham Castle, a gas explosion occurred, which occasioned somewhat severe injuries to an attendant; while one of the sightseers was also hurt to some extent. In the passage along which the dungeons are situated there are gas-burners for lighting up the place; and apparently some escape had allowed a quantity of gas to accumulate near the roof. The attendant had a lighted candle with him; and this no doubt ignited the gas, as the man had just ascended some steps for the purpose of indicating a particular arch to the party when the explosion took place.

The Proposed Sale of the Leigh Water-Works.—After a meeting which occupied three hours, the ratepayers of Leigh almost unanimously approved of the proposal to sell their water undertaking to the Southend Water Company (*ante*, p. 251). A poll of the town will be taken next Saturday; but there seems no reason to suppose that any different result will then be arrived at. The Council have already approved of this means of disposing of an undertaking which, from its inception, has been the cause of much anxiety to the townspeople. The offer of the Southend Water Company is to pay £14,000, and to maintain a constant and ample supply at a fixed charge which will compare favourably with the rate now imposed by the Council.

The Question of Competition at Bridgnorth.—The Bridgnorth Gas Committee, in their last quarterly report, stated that the introduction of suction gas had brought about an inexpensive competitor against coal gas. In Bridgnorth, the quantity of gas used for motive power exceeded a million cubic feet; and if the sales to this extent were lost, the cost of producing gas for all other consumers would be increased about 1½d. per 1000 cubic feet. The Committee therefore recommended that an endeavour be made to secure a continuance of the use of ordinary coal gas for motive power in the borough, by reducing the charge to 2s. 6d. per 1000 cubic feet for quantities of more than 50,000 feet in the half year. The Town Council have, however, referred the matter back to the Committee for further consideration.

CORRESPONDENCE.

[We are not responsible for the opinions expressed by Correspondents.]

Question-Papers for the Gas Manufacture Examinations.

SIR,—I should like to reply to Mr. Wm. Cranfield's letter given in your last issue, particularly to the last paragraph of it, referring to the Regent Street Polytechnic examination. I would point out that the students there are examined on the official syllabus; but for the purposes of the Polytechnic, an internal examination is held a few days prior to the official City and Guilds of London one. No distinction whatever was made between London and the Provinces as regards the examination held on April 28 last. The Examiner, also, is not Mr. A. F. Browne, who, so far as I am aware, officiates only for the City and Guilds of London Institute. It is news to me to know that grants are given to London classes, because I was of opinion that they were stopped some time ago.

I might also suggest that the indignation expressed and felt by Mr. Cranfield over the official questions would best be met by destroying the papers, and asking the City and Guilds of London Institute to frame a new set of questions to place before all students who cared to sit again at their various centres, if possible, on June 9 or other suitable date. This would no doubt meet the case, and give renewed encouragement.

East Ham, May 12, 1906. W. GRAFTON.

SIR,—I read with great interest, and fully endorse, Mr. Cranfield's letter on the above subject in the last number of the "JOURNAL," and was pleased to see that others beside myself considered the questions, especially Nos. 3, 5, and 9, were out of all reason for students in the ordinary grade. Comparing them with questions set in previous years for the honours grade, they are, in my opinion, quite as difficult.

Referring to question No. 3, I must admit that, to a certain extent, it is dealt with in one text-book—*i.e.*, "Hornby's;" but, beyond the information given at the bottom of page 34A, the students, to the best of my recollection and notes, did not receive any further information on the subject which would have enabled them to answer the question. With regard to question No. 5, I may say that our teacher, who dealt with as many points as possible in the short time allotted, in a perfectly explicit way, and who readily answered any queries made by the students, merely gave a brief outline of the description and working of the apparatus, extending over a period of from 30 to 45 minutes, but at the same time informed the class that he did not anticipate any questions on the manufacture of carburetted water gas. As to question No. 9, I find, on referring to one text-book, that there is no mention or reference to the "calorimeter," neither was it discussed in the class; and therefore it came as a complete surprise to all of us.

Taking the questions as a whole, they were more of an analytical character, and quite ignored what I regard as the most important point in the manufacture of gas—*i.e.*, the functions of the different apparatus and the best and cheapest methods of working them, so as to secure the highest results. In fact, I may say that when I perused the questions set down, I was inclined to return the paper to the Superintendent and leave the room as a protest.

I trust the Examiner, in considering the answers, will take into account the circumstances in which, to my knowledge, a large number of the students were placed, and award accordingly.

May 10, 1906. STUDENT.

The Cheapest Gasholder.

SIR,—Replying to Mr. Cripps's letter in last week's "JOURNAL," having reference to the remarks I made upon Mr. Nelson's paper on "Comparisons in Gasholder Design," I gave the round figure of £5 per 1000 cubic feet capacity as being closely approximate to the cheapest holder yet constructed, regardless of size or strength.

In giving this figure, I included the Bournemouth gasholder of 1,800,000 cubic feet capacity designed by Mr. Cripps; and evidently the figure I gave is within a small fraction of being correct, so far as that holder is concerned, as Mr. Cripps simply states that the cost was "less than" £5 per 1000 cubic feet capacity. The cheapest holders, I agree, are some of Sir George Livesey's at the South Metropolitan Works, which Mr. Cripps states cost "considerably under" £5 per 1000 feet capacity. It would be instructive to know what fractions of £1 the words "less than" and "considerably" represent.

So far as I can ascertain, the 5½ million gasholder designed by Sir George Livesey, and described before the Gas Institute in 1882, is the cheapest ever constructed. The cost for iron and steel work was £26,590, or £4 16s. 8d. per 1000 cubic feet capacity, or 3⅛ per cent. less than the figure I gave. The largest gasholder in the world, designed by the late Mr. Frank Livesey, as stated by him before the Institution of Gas Engineers in 1892, cost £61,000, or £5 per 1000 cubic feet capacity.

I am pleased to notice that the contents of the letter of such an eminent expert in gasholder design as Mr. Cripps, are so similar to my remarks to which he has referred; and I should like to take this opportunity of expressing my indebtedness to him for his excellent work on "The Guide-Framing of Gasholders," which is of great value to designers of such structures.

North Shields Gas-Works, May 12, 1906. A. CLEMENT HOVEY.

Cyanogen Recovery from Coal Gas.

SIR,—We have been much interested in the article by Mr. D. Stavorinus that has appeared in the "JOURNAL" on "Cyanogen Recovery at the Amsterdam (West) Gas-Works," the more so as it fairly describes the process for which letters patent were granted for this country in 1902, and of which we are the sole licensees. This process

has been in operation since 1902 at the works of the Plymouth Gas Company, and for the past twelve months at the Linacre works of the Liverpool Gas Company; and we can vouch for all that Mr. Stavorinus says of it—and more.

Our object in writing is to controvert the statement made at the end of the second portion of the article (*ante*, p. 110), where it is stated that "many modifications in the application of the system have been proposed by different chemists, in order to render it more economical in working; but up to the present they have been unsuccessful." This is hardly correct, as the slight differences in manipulation which characterize our process, compared with the one so minutely described by Mr. Stavorinus, give results which should satisfy even the most voracious profit-seeker; while the gentleman named has admitted that in Amsterdam "the financial results are not so good as were expected," . . . "yet fair profits have been realized."

W. NEILL AND SON.

St. Helens, May 10, 1906.

Working of Retort-House Governors.

SIR,—I have followed with much interest the paper of Mr. Leslie Wilson on this subject and the subsequent controversy.

Writing only from a theoretical point of view, I should like to emphasize one point which does not appear to have been much noticed. Mr. Wilson speaks of the results as "conditional on a high degree of suction between the exhauster and the retort-house governor." It is this reserve power of suction at its outlet which the retort-house governor makes it possible to bring right on to the retort-bench, and which enables it to deal so immediately and effectively with accumulating pressures in newly-charged retorts. I notice that at Stafford the pull of the exhausters on the outlet of the governors is maintained at from 1½ to 2 inches; while the vacuum in the hydraulic main is governed down to 1-10th or 2-10ths. What happens when retorts are freshly charged is a tendency to raise pressure in the hydraulic main. This tendency communicates itself at once to the governor-bell, which rises and lets the increase of gas through. So sensitive is the governor, and so sure the pneumatic action, that apparently this is effected without any show of fluctuation on the water-gauge. Probably the greater the vacuum (within reason) on the outlet side of the governor, the more efficient is this action. Reserve power is often in art an adjunct of delicacy; and I think we have it here in science. It remains to provide on the inlet side of the governor the greatest possible freedom for the transmission and equalization of the varying pressures which arise from the retorts. Naturally, as Mr. Cripps has observed, the ideal is a governor on every ascension-pipe; but this being presumably impracticable, his recommendations on the freedom of passage from retorts to governor are a criterion of successful working. A governor maker would know that large mains or pipes on the governed side are essential to the good working of any kind of governor.

In conclusion, I must say that the exhauster bye-pass governor has always seemed to me a very makeshift appliance; and it may well be supplemented by a more scientific instrument *in situ*. I have not touched on the question of the hydraulic seal; but I should like to see the retort-house governor successful in abolishing altogether this hindering and fluctuating device,

B. R. PARKINSON.

Hornsey, May 12, 1906.

Ironmongers and Municipal Trading.

At the conference of the Ironmongers' Federated Association held in London last week, Mr. P. H. Reed proposed: "That this conference strongly disapproves of the Bill introduced into Parliament by Mr. Money, backed by Sir C. Dilke, Mr. Alden, Mr. Gooch, and Mr. Henderson, seeking powers to enable local authorities to acquire and establish any business or industry whatsoever without the necessity of applying for parliamentary sanction." He said he considered that the advances which continued to be made in the direction of municipal trading constituted a serious menace to private enterprise, and must lead to the injury of retailers. He regretted that the promoters of the Bill could not find some better means of employing their time. The Brighton Corporation were again seeking powers to do inside wiring for electric lighting; and if the Bill were passed, corporations would be able to open bakers' or butchers' shops without check from Parliament. What would then become of the ironmongers? The motion was carried; and it was suggested that each member should be asked to communicate the resolution to his own representative.

The French Welsbach Company.

In the report of the Société Française d'Incandescence par le Gaz (Systeme Auer) for the past year, it is stated that the gross profits amounted to £50,800 and the net profits to £33,436—the latter as compared with £30,280 in 1904. It is proposed to pay a dividend of £1 4s. per share on the capital of £80,000, as contrasted with £1 per share before. The Directors, in referring to the Elworthy patents for methane gas, mention that the Company hold a licence for them, and are seeking to utilize the invention in association with the Lyons Gas Company. The experiments which have already been made have led to improvements, for which new patents have been applied for. But considerable difficulty has to be overcome; and the position has been rendered worse by the unfortunate death of Mr. Elworthy. In addition to this, the patents have been attacked, though some of the objections have already been disposed of by the German Patent Office, which has granted the patents. Various actions are, however, still pending, and may last a long time. As to the osmium lamp, the report states that the time for the realization of results has now been reached, after numerous installations of the lamp have confirmed its advantages. The Company have purchased land for the erection of a new factory on a site of their own.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following further progress has been made with Bills:—

Bills read a second time and committed: Bacup Corporation Bill, Cardiff Gas Bill, Carlisle Corporation Bill, Gas Companies (Removal of Sulphur Restrictions) Bill, New Mills Urban District Council Bill, North-East Lincolnshire Water Bill, Thornton Urban District Gas Bill, Todmorden Corporation Bill, Uxbridge Gas Bill.

Bill reported: Glamorgan and South Wales Water Bill.

Bill read the third time and passed: Bury Corporation Bill.

The Great Yarmouth Water-Works and Lowestoft Water and Gas Bill has been referred to a Select Committee, consisting of Lord Brougham and Vaux (Chairman), the Duke of Wellington, Lord Willoughby de Broke, Lord Dumboyne, and Lord Suffield, who are now sitting.

Petitions have been presented against the following Bills: Cardiff Gas Bill, by the Caerphilly Urban District Council; Uxbridge Gas Bill, by the South-West Suburban Gas Company and the West Suburban Gaslight and Coke Company.

HOUSE OF COMMONS.

The following further progress has been made with Bills:—

Bill read a second time and committed: Local Government Provisional Orders (Gas) Bill.

Bills reported, with amendments: Accrington District Gas and Water Board Bill [Lords], Ascot District Gas (Electric Lighting) Bill, Brixham Gas (Electric Lighting) Bill, Bury Corporation Bill [Lords], Holyhead Water Bill [Lords], Mirfield Gas Bill [Lords], Pontefract Corporation Bill, Sutton, Southcoates, and Drypool Gas Bill.

The Heacham Water Bill and the Shrewsbury Corporation Water Bill have been withdrawn.

The Wandsworth Borough Council have petitioned in favour of the Sutton District Water Bill; and the Croydon Corporation and the London, Brighton, and South Coast Railway Company against it.

SUTTON, SOUTHCOATES, AND DRYPOOL GAS BILL.

House of Commons Committee.—Monday, May 7.

(*Before Major* SEELY, *Chairman, Sir* ROBERT HOBART, *Mr. F. W.* HERVEY, *and Mr.* MACPHERSON.)

By this Bill, promoted by the Sutton, Southcoates, and Drypool Gas Company, authority was sought, among other things, to change the name of the Company to the East Hull Gas Company, to consolidate the existing and raise further capital, to establish a renewal fund, and to vary the clause in the Company's Act with reference to public lighting.

The promoters were represented by Mr. BALFOUR BROWNE, K.C., Mr. HONORATUS LLOYD, K.C., and Mr. A. M. PADDON; the Hon. J. D. FITZGERALD, K.C., and Mr. JEEVES represented the Hull Corporation, who opposed the Bill.

Mr. LLOYD, in opening, said the Company was incorporated as a statutory concern by Act of Parliament in 1867. The share capital was then fixed by Parliament at £100,000, on which the dividend was limited to 7½ per cent.; and the loan capital authorized was £5000—in those days it being sometimes the custom for Parliament to grant a very small proportion of the total capital in the shape of loan capital. There were further Acts in 1873 and 1890; but by these no additional capital was sought. With reference to the proposed conversion of 7½ per cent. into 5 per cent. capital, he submitted that this would make no difference to the consumer or to those in any way interested in the undertaking, as the amount that could be divided remained the same. But it had this convenient effect, that it put the actual value of the share nearer to the nominal value. The result was that they were able to raise their money better, because people were more willing to give a good price for a share which stood at a slight premium than one which stood at a very high premium. Therefore it was both in the interest of the Company and of the consumer. He next came to the proposals for additional share and loan capital. They were asking for further capital to the amount of £144,999. Then the question would arise as to whether there was any necessity for granting so much money. He would call evidence to show that they had overspent their capital to the extent of £7236, and therefore they would have available something over £100,000 if the powers sought were granted. A very important matter was that regarding the proposal to establish a renewal fund. With the plant that was necessary for modern and up-to-date gas-works, it had become so expensive that a company had difficulty in providing for renewals out of their current expenses; and the result had been that perhaps a little irregularity had occurred. Gas companies had been in the habit of bringing into existence a special account, because it had been impossible to pay in any one particular year the very large sums which were necessary in respect of modern plant. They could find no express justification for this in the Public Acts. Therefore companies had come to Parliament and said that it was irregular, and that it would be more satisfactory if it were legalized.

Mr. JEEVES remarked that this had not been done in the case of a maximum-price company where there was opposition.

Mr. LLOYD said he thought his friend was right. It had been done by Parliament on several occasions; but he did not think it had been

done in circumstances such as those named by Mr. Jeeves. With reference to sliding-scale companies, the issue had been discussed on many occasions; and the result had been a renewal fund upon the lines proposed in the Bill. Then the promoters desired to amend section 61 of their Act of 1867. This was a clause which provided for the local authorities having the public lights furnished by the gas companies and lighted by them. The clause read: "Provided always that it shall not be lawful for the company to charge for the supply of gas to any public light a higher rate for 1000 cubic feet than the lowest price which they shall for the time being charge to any private or other consumer." In other words, they had the most favoured-nation clause. A large quantity of gas was now being used for engines, for power, and also for heating. It had become necessary, if gas companies were to fairly compete with existing undertakings, that they should give for power and heating purposes a supply of gas at a less price than for lighting purposes. The result was that the Corporation would say: "If you do that, you have got to bring down the cost of the supply for public lighting." He submitted that it was never intended that the Corporation should be entitled to have gas for public lighting at the special price at which it was supplied for power and heating. In their petition, the Corporation submitted that, in the interests of the inhabitants of the city, the Company's undertaking should be transferred to them; that, accordingly, no further powers should be conferred upon the Company which would either hinder or prevent the acquisition of the undertaking; and that therefore the Bill should not proceed. The Corporation had neglected many opportunities of putting forward their case if they desired to purchase the undertaking; and the same remark applied to the British Gaslight Company, who supplied the other part of the city, with the exception of a little bit of their own. Counsel submitted that there was no precedent whatever for Parliament providing in a statutory company's Bill for a purchase. In the case of a company to which statutory powers had been given, he thought he was right in saying there was no instance in which Parliament had provided that a local authority might purchase against the will of the company. The latest instance of such an attempt was in the Merthyr Tydfil case of this session; and in that case the terms were arranged as the result of a conference. He contended that it was inequitable that they should be called upon to submit to a clause of this sort when there had been no default on their part, and when the larger portion of the area was outside the city of Hull.

Mr. *Corbet Woodall* said he regarded the conversion of capital from 7½ to 5 per cent. as being purely a domestic arrangement. The price of gas was now 2s. 4d. per 1000 cubic feet, less discount, which was very reasonable, and must be satisfactory to the district. There was a great demand for gas for power purposes. With regard to gas consumption in general, he had never known the rate of increase to be so satisfactory as during the last ten years. Recent practice had confirmed the policy of a renewal fund in the case of gas companies. It was a very objectionable practice to put up new plant and not to write off old plant. If it was not provided for in a very short time, it almost necessarily meant that the price of gas would be kept up.

Mr. Jeeves said that, in the Act of 1847, clause 31, it was provided that renewals should come out of the reserve fund.

Mr. Paddon expressed the opinion that "extraordinary claims," &c., mentioned in that clause could not be brought under the head of renewals.

Witness said that a renewal fund was an economically sound way of dealing with the matter. Proceeding, he remarked that there was one of two reasons he would like to see to justify a transfer. One was that both sides should be willing; the other was that the company was badly fulfilling its obligations.

A Member of the Committee asked witness's views as between municipalization and private enterprise.

Witness replied that, if it could be shown that it would be to the public interest that an undertaking should be transferred to a corporation, then the private investor must go down. He denied that the public interest was enhanced by the transfer in this case. Still, he should be sorry to see the industry taken out of the hands of private enterprise. He asked the Committee to bear in mind that there was hardly a case in which it had been proposed to transfer a gas company to a corporation excepting where something like a maximum dividend had been paid. A company often went through long years of adversity, when it was receiving a very small return indeed; and it seemed a little hard that the corporation should wait until the industry was well established and then come in and say "Now we will take it." He added that the position of private enterprise as against municipalization was different now from what it was twenty years ago.

In cross-examination, witness admitted that the Company had paid maximum dividends from the commencement.

Mr. Balfour Browne: Do you think that the right course for a corporation to take is, if they do want to purchase, to come straight and square for a Bill to purchase, instead of appearing against a company's Bill and asking a clause?

Witness: I do.

Tuesday, May 8.

The first witness called to-day was,

Mr. *John Holliday*, the Engineer and Manager to the promoting Company, who, in examination by Mr. Paddon, said that he anticipated a large extension in the supply of prepayment meter installations. Their present financial position stood in the way of their meeting the requirements of the working classes in this respect. They were charging the opposing Corporation a little under 2s. 2d. per 1000 cubic feet for gas; but their price at the present time was 2s. 4d. There was a discount of 5 and 7½ per cent. allowed upon this rate. If the present Bill became law, they would only get £108,000; but the future capital requirement of the Company was £142,000. Their average make of gas for one particular week was 852,000 cubic feet per day.

This concluded the case for the promoters.

Mr. Fitzgerald, on behalf of the opposition, called

Alderman *Larard*, the Mayor of Kingston-upon-Hull, to give evidence. He said the Corporation as well as himself were in favour of the taking over of the Company's works. In the year 1897, the Corporation acquired the undertaking of the Kingston Gas Company. This resulted in a considerable reduction in the price of gas; and while paying off sinking fund and interest into the bargain, they had a small margin left. If their district was extended, and they acquired the undertaking of the promoters, the saving would be further increased, and there would be no difficulty in supplying the whole town from the works of the Company. The clause they wanted as to main-laying was similar to the one in the Rochester and Chatham Bill, which read as follows:

> Any mains or apparatus laid down by the Company in private streets within the respective boroughs of the three Corporations shall be laid in such position, and at such depth, as may be reasonably required by the Corporation in whose borough such mains may be intended to be laid; and if any difference arises under this section between the Company and such Corporation, the same shall be determined by arbitration under the provisions of the Arbitration Act, 1889.

Mr. Paddon intimated that they were prepared to concede such a clause.

Mr. *F. J. Bancroft*, the Gas Engineer to the Hull Corporation, said that he had examined the works of the promoters, and found that the maximum make was 886,000 cubic feet per day. He had allowed them 35 per cent. increase during the next ten years, based upon the increase that had taken place in the past ten years. This would give them a maximum make per day of 1,196,000 cubic feet. The only capital they required was £750 for a scrubber, £3000 for workshops and stores, £13,400 for mains for the next ten years, and their overdrawn capital of £7236—making the total requirements for the next ten years £24,386. The unaccounted-for gas at one time was as high as 15 per cent., including about 1 per cent. that they used on the works. They had now brought it down to 7½ per cent. The economies of the Corporation were not entirely dependent upon what the British Gaslight Company could sell them gas at. The Corporation did not make gas themselves. They bought out the old Company and took it over in the year 1898. The profit made by the old Company in that year was £4937. The next year, under the management of the Corporation, the profit was £6174. They then reduced the price of gas 2d. per 1000 cubic feet, which was equivalent to £800 reduction to the consumer, and still they made £4902 the following year. Then the works were pulled down; and last year, with a reduction of 6d. from the price charged by the old Company, they had paid all their sinking fund and interest charges and made a profit of £3051.

Mr. Fitzgerald, in addressing the Committee, said that the reason Parliament limited the capital of gas companies was that it was desirable that they should be under parliamentary control; and if they were given a large amount of capital, which carried them on for (say) 50 or 60 years, they were outside parliamentary control altogether. They were not bound to come back to Parliament, and there were no means of inquiring into what they were doing. They had heard from the last witness that £24,000 ought to carry the Company on for ten years; and if the Committee thought that ten years was too short a time, then sufficient capital to carry them on for 12 or 15 years would be represented by £30,000 or £40,000. The most important question in the case, however, was whether the Committee should insert in the Bill a clause providing for the purchase of the undertaking by the Hull Corporation on their obtaining the assent of Parliament. The legislatiou of the last thirty years showed that Parliament had looked with friendly eyes upon the acquisition of gas undertakings by local authorities; and that was especially so in the case of those large corporations who were capable of paying a proper sum for skilled and intelligent management, and were capable, through their committees, of looking at all sides of the question.

Mr. Balfour Browne, in reply, appealed to the Committee not to make such a precedent as was being asked. If the Corporation were *bonâ fide*, let them come next year and promote a Bill for the purchase of the Company's undertaking.

The Committee found unanimously that they were prepared to pass the preamble of the Bill on two conditions. One was that a purchase clause on the lines of the Merthyr Tydfil clause should be inserted; and the second was that in clause 48, the words "for lighting purposes" should be left out.

Wednesday, May 9.

On the re-assembling of the Committee to-day,

Mr. Fitzgerald stated that some questions would arise upon the clauses which were to be brought up to carry out the decision of the Committee; but there was a possibility of an agreement being come to.

Later in the day,

Mr. Wakeford announced that the whole of the points left over for discussion had been entirely settled. The clauses were then formally adjusted, and the Bill, as amended, was ordered to be reported.

The suspensory clause inserted was as follows:—

> If the mayor, aldermen, and burgesses of the Borough of the City and County of Kingston-upon-Hull shall introduce a Bill into Parliament in the next session for an Act to empower them to purchase the undertaking of the Company, nothing in this Act contained shall be deemed to prejudge or prejudice, one way or the other, the question of such purchase; and in the event of such Bill becoming law, the value of the undertaking shall not be enhanced or depreciated by the passing of this Act, or by anything herein contained, but, in addition to the value thereof, the Company shall be repaid all moneys which the arbitrator arbitrators or umpire who determine or determines such value may deem to have been reasonably expended by the Company in obtaining this Act. But the Company shall not issue any capital stock before the 1st day of December, 1906; and if the said mayor, aldermen, and burgesses shall give notice of, and introduce, and *bonâ fide* promote, such Bill, then, during the promotion of such Bill, the Company shall not borrow any moneys save for the purposes of the costs aforesaid and otherwise as hereinafter provided up to the passing of the said Bill. Provided always that, notwithstanding any other provisions in this Act contained, the Company may borrow for the purposes aforesaid and for the following purposes—that is to say: (1) To replace capital expenditure by the Company up to the 31st day of December, 1905, amounting to £7236 18s. 7d. beyond the capital of the Company raised under the Act of 1867; and (2) any further capital expenditure by the Company, or for which the Company may become liable up to the date of the passing of the said Bill so to be introduced for the general capital purposes of the Company, but the amount to be borrowed for purposes numbered (1) and (2) shall not exceed in the whole £14,000.

WOLSTANTON URBAN DISTRICT COUNCIL GAS BILL.

Court of Referees.—Wednesday, May 9.

This Bill, which has already passed the House of Lords (*ante* p. 48), came before the Court to-day—Mr. J. H. CARDWELL presiding—on the question of the *locus standi* of Henry George Ball and others who had petitioned against it.

Mr. R. S. CLEASE appeared for the petitioners; and Mr. C. C. HUTCHINSON represented the promoters.

Mr. CLEASE said he appeared for the eighteen gentlemen who had signed the petition in question, and who not only themselves represented a considerable amount of the rateable value of the district, but also a very much wider section of the community there, who had attended a public meeting and adopted a resolution condemning the proposed purchase of the gas undertaking. The meeting was held in the largest room the district possessed. There were something like 300 or 400 people at the meeting; while some hundreds more were unable to get in. A resolution had been carried by an overwhelming majority, and a further petition had been numerously signed. The present petitioners therefore sought the *locus* which he submitted they had a perfect right to obtain. He might say that 1093 inhabitants had signed the second petition; and the ground of objection was that the gas-works were very small, having been valued by an eminent expert at £1600, and that their acquisition would afford no advantages, but would have the effect of increasing the price of gas.

Mr. HUTCHINSON, in reply to Sir CHANDOS LEIGH, said he objected to the petition as owners and occupiers, because they did not allege that they would be injuriously affected as ratepayers; and he contended they had no *locus* as consumers, as they did not use the supply.

Mr. CLEASE said he would contend they had *locus* as consumers. At present a part of Wolstanton was supplied by the Burslem Gas-Works, and another part by the Corporation of Newcastle-under-Lyme. Instead of purchasing the portions of the Burslem and Newcastle undertakings, the promoters' idea was to acquire this small gas undertaking and continue the supply from there. At present, they were being supplied at something like 2s. 6d. per 1000 cubic feet in the greater portion of the district by these Corporations; but the gas supply from these sources would be injuriously affected by the passing of the Bill. In reality, the present supply was considered satisfactory.

Mr. HUTCHINSON, in reply to Sir CHANDOS LEIGH, said the petitioners could not complain about the maximum price of gas, because, as regarded the present supplies from outside, in one case the maximum price was the same as theirs, and in the other case it was higher.

Mr. CLEASE said the fact remained that in the Bill they sought to charge a maximum of 4s. per 1000 cubic feet, and under this power they might increase the price from 2s. 6d. (which petitioners now paid) to 4s.

The CHAIRMAN: Are Burslem and Newcastle-under-Lyme petitioning?

Mr. CLEASE: Oh, yes. He added that he claimed *locus standi* as consumers.

Mr. HUTCHINSON said the view of the petitioners was that they would be injuriously affected by the works being taken and not the other supplies existing within the district; but he would like to point out that they already possessed the powers, as regarded the Burslem supply, to purchase their pipes and mains within the Wolstanton district. This was provided for in the Act obtained by Burslem in 1877. The petitioners' chief objection was that the price of gas would be increased.

Lord R. CECIL: They say the probability is you will supply at an increased price.

Mr. HUTCHINSON said that in a petition they must go further than a statement of this kind. He could, if he liked, supply gas at a loss, and charge the loss on the rates.

The CHAIRMAN, after consultation, said the unanimous decision of the Court was that the *locus* was allowed.

PONTEFRACT CORPORATION BILL.

Police and Sanitary Committee—House of Commons.—Monday, May 7.

(*Mr.* J. W. WILSON, *Chairman.*)

This Bill, which (*inter alia*) is to give the Pontefract Corporation authority for the acquisition of the undertaking of the Pontefract Gas Company, was again before the Committee to-day for the consideration of clauses. Previous proceedings were reported last week (p. 382).

Mr. WEDDERBURN, K.C., and Mr. F. N. KEEN appeared for the promoters; Mr. FORBES LANKESTER and Mr. R. S. CLEASE represented the Gas Company.

Mr. WEDDERBURN said no comment was made on the gas clauses by the Local Government Board which had not been met, and the opponents of the Bill had withdrawn.

Mr. *E. H. Stevenson*, recalled on clause 47, which relates to the "inspection of works and books of the Company," said he supported the clause because in an arbitration the purchaser had not the right to look at the books until an order was made by the arbitrator in the case; and therefore if, as had sometimes been the case, they had to get an order for certain information, it would delay the arbitration and increase the expense. Practically, the clause meant that they would have the right of inspecting the accounts, because it was upon these that the arbitration would take place and the value be settled.

In reply to Mr. CORRIE GRANT, witness said he had sat as an arbitrator, but had never given an order as wide as was contemplated by the clause. The arbitrator, however, had power to do so.

The clause was struck out.

On clause 36, providing for the Company selling their undertaking, witness said this was discussed by the Directors and the Corporation when they first met, and the latter then passed a resolution which was practically embodied in the clause.

On the suggestion of the CHAIRMAN, the notice required in the clause was limited to be given "within three months;" and in this form the clause was passed.

On clause 51, "limiting the price of gas," the Local Government Board made the following observations: "The Board would draw attention to the high maximum price of gas proposed in this clause. They suggest that the Committee should be informed of the price at present charged for gas by the Company. The maximum price proposed is the same as that authorized by section 44 of the Act of the Company; but the Board understand that the price charged is very substantially less than the maximum."

Mr. WEDDERBURN said that, in accordance with this comment, the Corporation had reduced the figure to 4s. They had originally proposed to take over the maximum price of the Company—5s. 6d. per 1000 cubic feet. But they now suggested that the margin between 2s. 11d. and 5s. 6d. was too large; and they were prepared to reduce the maximum to the sum he had stated.

The CHAIRMAN remarked that 5s. 6d. referred to ancient history; and expressed the opinion that 4s. was none too low. He added that the maximum in the middle of Yorkshire, as in the present case, ought to be as low as at any place in the country.

Witness said he did not think they ought to compare works of the size of those at Wakefield or Leeds with the works at Pontefract; but he thought 4s. was a fair maximum price.

The clause, as altered, was passed.

On clause 54, as to "quality of gas,"

The CHAIRMAN said he thought there was some evidence about the 14-candle illuminating power of the gas.

Mr. WEDDERBURN said the evidence was that, though they were bound to supply 14-candle gas, they were, in fact, sending out gas of 16-candle power; and they were not going to lower this quality.

The clause was passed.

On clause 63, giving the Corporation power to supply gas stoves, fittings, &c., for heating and other purposes,

The CHAIRMAN remarked that it would be a great advantage if they reduced the price of gas, as proposed, when used for power and cooking purposes. It was usually the experience that when this was done the demand was increased.

Witness, in the course of further evidence, said that, in his opinion, the town ought to have practically two generations in which to clear off the purchase of the gas undertaking. They had to acquire not only the works themselves but also the goodwill; and, to his mind, two generations were equal to 50 years. This was more than had usually been given recently; but it used to be allowed when money was at about the same price as now. Of course, with a higher rate, if they kept to the shorter terms which had been given for repayment, it put a very heavy burden upon the undertaking. The period they asked was 50 years.

The CHAIRMAN: If you buy gasholders or mains that are half corroded or eaten away, you would not say they ought to have as long time given as if they were newly put up?

Witness said the plant in this case had been well maintained with the exception of the retorts. The age varied; but the greater part of the works now could not be more than about 10 or 15 years old. Some of the mains were older and some were not. Witness added that he did not think the mains were likely to perish in the soil in which they were laid, as it was not the kind they found in Yorkshire manufacturing towns like Sheffield, which acted upon the pipes and destroyed them very rapidly. At Pontefract, there was no reason why a main should not be taken up at the end of forty years to all intents and purposes as good as when it was put down. With regard to the holders, a gasholder would generally last intact for about fifty years without re-sheeting. It then needed it; or if the undertaking had grown very much, the holder would probably be taken down, and then the expenditure came in the form of renewals, and was paid for by 6d. or 7d. per 1000 cubic feet every year. The Company was formed thirty years ago.

After some further consideration, the Committee decided to give 45 years as the period for repayment; and the clause was amended accordingly. They also allowed 25 instead of 30 years for the repayment of the amount required for extensions and reconstruction work.

Tuesday, May 8.

The hearing was resumed this morning, when other clauses, relating to sanitary matters and improvements, were considered.

After various slight alterations had been made, the Bill was ordered to be reported for third reading.

UNOPPOSED BILLS.

The Unopposed Bills Committee of the House of Commons presided over by Mr. ALFRED EMMOTT, the Chairman of Ways and Means, had before them, last Thursday and Friday, among others, the following Gas Bills.

Mirfield Gas Bill.

This Bill is to enable the Mirfield Gas Company to convert and consolidate their existing capital, raise more money, and supply gas for power purposes.

Mr. BILLING, who appeared for the promoters, explained that the authorized capital of the Company had been expended, and they had issued as capital certain sums for which they had borrowing powers. They were seeking authority to obtain a total amount of £145,000.

Mr. *Robert Porter* stated that the present consumption of gas was 95¼ million cubic feet per annum; and he estimated that this quantity would be increased in 15 years to 229 millions. The amount required per million cubic feet was £700. Between 20 and 30 per cent. of the inhabited houses in the district had no gas; and the Company were

supplying fittings free with prepayment meters. In the year 1860, powers were granted to them to raise additional capital by borrowing; and of the new capital, £30,000 would be wanted to meet the estimated requirements of the next 15 years. The capital of the Company was divided into £63,000 of share and £10,000 of loan capital; but this was all spent. The illuminating power of the gas was 16½ candles; and they proposed to reduce it by 1 candle.

The Committee expressed surprise at such a reduction, when the maximum price of gas was 4s. per 1000 cubic feet, which they considered enormous. The promoters consented to reduce it to 3s. 9d.

The CHAIRMAN said, with regard to the clause relating to the supply of gas for power, the Committee could hardly allow one of its provisions without a precedent; and they unanimously decided that it must be struck out. The provision referred to is the following:—

> The Company shall not be bound to supply gas for power purposes to engines attached to private power or suction-gas plant without 24 hours' notice from the consumer on each occasion when such supply is demanded, and except for such period only as such supply can be given without interfering with the supply of gas for public or private lighting purposes, or for use for power purposes by consumers whose engines have no connection with any such private power or suction-gas plant.

Ascot District Gas (Electric Lighting) Bill.

The chief object of this Bill, promoted by the Ascot District Gas Company, was for power to supply electricity.

Mr. LEES, for the promoters, explained that the Bill had for its object the extension of the Company's limit of supply by including an additional parish to the extreme south of the area of supply. The Local Authority were quite in agreement with these proposals. The most important provision in the Bill, however, was that to enable the Company to supply electricity. With regard to this, there was a competing scheme, promoted by a firm of electrical engineers, who applied to the Board of Trade for a Provisional Order to supply four parishes in their district only. On April 4, the Board of Trade held a meeting to inquire into the Provisional Order; and on the 25th of the same month they decided to refuse it. The opposition to the present Bill was then withdrawn; and the Local Authorities within the area of supply agreed to the present suggestion. The Company proposed to erect a generating station on their gas-works in the parish of Sunningdale, and to supply, in the first place, the parishes of Sunningdale and Sunnyhill and the adjoining parish of East Hampstead. The total expenditure on the electrical undertaking was about £26,900.

Sir CHANDOS LEIGH: What is the amount of additional capital you want?

Mr. LEES: £30,000 of share capital and £10,000 of loan capital; but they also asked for £5000 extra borrowing powers—making a total of £45,000. Of this, £27,000 would go to the electrical undertaking, and the balance to the gas undertaking. All of the capital had been allocated; and, in fact, the Company would require the whole of the money asked for during the next 12 or 15 years. The entire share capital had been issued, and they had obtained power to borrow £4000. Altogether they had spent £76,500. The make of gas had been doubled in seven years; the total make at the present time being 42 million cubic feet. With regard to the price of gas, they were authorized to charge, within two miles of the works, 6s. per 1000 cubic feet, and beyond that distance 7s. During the past seven years, however, the price had never exceeded 4s. 9d., and for some considerable time past it had been gradually decreasing; the price at the present time being only 4s. 3d. They had placed a clause in the Bill to make a reduction to a uniform charge of 5s. If they could earn the dividend, they could pay 10 per cent. Although the dividends had been gradually on the increase, they had not yet exceeded 5½ per cent.; this amount being paid last year. They had kept the shareholders on small dividends and charged a low price for gas.

Sir CHANDOS LEIGH: Assuming that this had been an Electricity Bill, and you had not been a Statutory Company, you would have had to go to the Board of Trade for a Provisional Order. But when you are a Statutory Company, and it becomes a joint Bill, the Board of Trade allow you to go on?

Mr. LEES: That is so.

The CHAIRMAN: Your reduction in the price of gas was voluntary?

Mr. LEES: That is so. We did it to increase the business.

It was mentioned that the Commissioners of Works were not satisfied with a clause in the Bill relating to the erection of the generating station.

Mr. LEES, in reply, stated that he had received a communication from the Treasury Chambers on the subject; and he wrote in reply giving an undertaking to put a clause in the Bill. He had complied with that undertaking. The generating station would be built on their gas land. Their works had been there for 24 years.

The CHAIRMAN: The Committee understood you to say that you had put in a clause, but not the one the Commissioners asked for.

Mr. LEES: I have put in every clause that I have been asked to put in. Until the Chairman raised the point, I have not heard of an objection.

The CHAIRMAN: What possible danger is there of making any nuisance with your electricity generating station?

Mr. LEES: This is a question of principle, and a very important point. There is a possibility that a nuisance will be created; but the probability is there will be none. This question of principle affects other promoters; and if you are really thinking of altering the practice that has prevailed, I would ask that, before any decision is given, possibly other parties who will be affected by the decision will have an opportunity of being heard, and you will see your way to report the Bill in its present form. It will not prevent an amendment being made at a later stage.

Mr. BRYNMOR JONES: What guarantee have the inhabitants that you will use your best endeavours to prevent nuisance from the works?

Mr. LEES: If I do not do that, they can obtain an injunction.

The clause complained of was as follows:—

> The Company shall not, except with the approval of the Commissioners of Works, erect any generating station, or take a supply of energy from any generating station, unless the site of such generating station is specified in an Act of Parliament, or in an Order confirmed by, or having the effect of, an Act of Parliament, provided always that this section shall not apply to any sub-station for the transformation and distribution of electrical power.

The Committee were unanimous that the part of clause 2 which read "The provisions of section 81 of the said schedule shall not apply to any generating station erected on any lands described in the schedule to the Act of 1882, or in the first schedule of this Act" should be taken out.

The CHAIRMAN (to Mr. Lees): I think it is quite right to report this as a matter of principle; but for you it is a very minor matter.

Brixham Gas Bill (Electric Lighting).

By this Bill the Brixham Gas Company sought power, among other things, to supply electricity.

Mr. LEES, for the promoters, said the main object of the Bill, as in the case of the Ascot Bill, was to enable the Company to supply electricity. Brixham was another large place. Three District Councils had obtained a Provisional Order enabling them to supply electricity; but they had not found themselves in a position to carry it out. The suggestion was made to the Company that they might be able to supply electricity in connection with their works. The Company and the Councils had discussed the matter, with the result that this Bill was promoted. The Brixham Council were there, and would be prepared to confirm his statements. The authorized capital of the Company was £20,000. The whole of the share capital had been issued; but the loan capital was still available. The total capital expenditure was a little over £19,500. The price of gas was 4s. per 1000 cubic feet, except for power purposes, which was 3s. 6d.

The Committee took out of the Bill the clause with reference to a generating station, as in the case of Ascot.

The Bill was ordered to be reported.

CUMBERLAND ELECTRICITY AND POWER GAS BILL.

Protective Clauses.

The Select Committee of the House of Lords, presided over by the Earl of Lauderdale, had the above Bill before them on Monday of last week. It was to incorporate a Company for the supply of electricity and power gas in the boroughs of Workington and Whitehaven, as well as in a number of urban districts, all in Cumberland. There were several petitions against the Bill; but it was stated by Counsel that terms had been arranged with all the opponents with the exception of the Corporation of Workington, for whose protection he submitted the following clause:—

(1) If within twelve months from the time when the Company have erected an electrical generating station capable of generating sufficient current for the supply of electrical energy to the Corporation, the Corporation, for the purpose of distribution under their powers in that behalf, agree to take a supply of electrical energy in bulk from the Company of an amount, and upon terms to be agreed, or failing agreement to be settled by arbitration as hereinafter provided, then, so long as the Corporation continue to take such supply, the Company shall not supply electrical energy except to authorized undertakers or to any railway, tramway, tramroad, or water company or proprietors, or trustees of any canal, harbour, dock, or navigation, within so much of the borough of Workington as is coloured pink on the Ordnance map signed in duplicate by Frederick Henry Maitland, the Chairman of the House of Lords, to whom the Bill for this Act was referred, one copy of which map has been deposited in the Parliament Office of the House of Lords, and one copy in the Private Bill Office of the House of Commons.

(2) The Company shall not within the said area, coloured pink as aforesaid, supply any power gas, or lay down any main for the supply of power gas, other than, and except, one trunk main for conveying through the said area power gas, such through main to be of a diameter not exceeding 2 feet, according to a line of route to be reasonably proved by the Corporation.

(3) The Company shall not in any case, except with the consent in writing of the Corporation, supply any power gas within any part of the borough, except for use in engines, which shall, in the case of each consumer so supplied, have a total capacity of not less than 50-brake horse power installed and in general use, and at least one engine of not less capacity than 25-brake horse power installed.

(4) The Company shall not, so long as the Corporation have power and authority to supply electrical energy for public and private purposes within the borough, exercise, in respect of the borough, the right conferred upon them by the section of this Act the marginal note whereof is "As to Application of Provisional Orders," nor shall the Company oppose any application the Corporation may make to extend the period of any Order under which they shall have any such power or authority.

(5) If any difference shall arise between the Corporation and the Company under the provisions of this section, such difference shall be settled by an arbitrator to be appointed, failing agreement, by the Board of Trade on the application of either party.

In the course of the proceedings, the attention of the Committee was called to an observation in the report by the Home Office on the Bill to the effect that no limitation had been imposed in regard to the percentage of carbon monoxide in the gas proposed to be supplied. It was pointed out that power gases usually contain a much larger percentage of carbonic oxide than coal gas, and that the risk of poisoning is, in their case, consequently much greater than in that of coal gas. The report went on to say that one of the most important precautions in the interests of safety was that the percentage of carbonic oxide in the gas should be definitely limited, and that a provision to this effect had been inserted in the protective clauses in all previous Bills. The Secretary of State strongly recommended that a similar one should be included in the present Bill. The limit usually fixed in previous Acts had been 14 per cent.; but, if the promoters preferred it, the Secretary of State saw no objection to a modification of the usual provision, such as was allowed in the Esk Vale Power Gas Order Confirmation Act of last session, that the gas should not contain more than 14 per cent. of carbon monoxide, "or such higher percentage as may be approved by a Secretary of State." The matter gave rise to some argument; and eventually the clause was amended so as to define the words "power gas" as "gas approved by the Board of Trade and the Secretary of State for the Home Department."

GLAMORGAN AND SOUTH WALES WATER BILL.

House of Lords Committee.—Monday, May 7.

(*Before Lord* NEWTON, *Chairman, the Earl of* WESTMORLAND, *the Earl of* WICKLOW, *Viscount* HUTCHINSON, *and Lord* TEYNHAM.)

By the above-named Bill, the Glamorgan County Council seek power to expend money for the purpose of making inquiries as to suitable sources of water supply outside the county area, and also to form districts, or combinations of urban and other local authorities, to maintain an adequate water supply. The Bill was petitioned against by the Metropolitan Water Board, the London, Monmouthshire, Breconshire, and Radnorshire County Councils, the Merthyr Tydfil Corporation, and other Local Authorities.

The Hon. J. D. FITZGERALD, K.C., and Mr. VESEY KNOX appeared for the promoters. Mr. R. P. BLENNERHASSETT, K.C., and Mr. T. B. ASPINALL for the London County Council; Mr. HONORATUS LLOYD, K.C., and Mr. H. COURTHOPE MUNROE for the Metropolitan Water Board; Mr. RAM, K.C., for the Monmouthshire County Council; Mr. G. J. TALBOT, K.C., and the Hon. J. C. BAILEY for the Breconshire County Council. The other petitioning Local Authorities were also represented.

Mr. FITZGERALD, in opening the case, said that the Glamorgan County Council sought powers to make inquiries as to water supplies for South Wales, and also to form water districts. The reason for the Bill arose from the peculiar circumstances of the County of Glamorgan in relation to its existing population, as well as to a large future population that would certainly come into existence, and the present and future demands for water; and therefore it would be necessary to deal to some extent with the physical features of the county and the mining operations going on there. Glamorganshire was the centre of the South Wales coalfields, and steel-works and tin-plate and other industries were carried on which were likely to add largely to the industrial population. In 1851, the population of the county was 231,000; in 1901 it was 860,000; and at present it was estimated at 970,000. If this ratio of increase continued, there would by 1951 be 2½ millions of people in the county. The figures he had given included the large county boroughs of Cardiff and Swansea, which for the purpose of the Bill might be omitted; but it was obvious that to secure a proper water supply for the county was a matter which presented some difficulty. This was increased by the physical conditions of the county, and through the establishment of collieries in various districts leaving a large number of small towns to be provided with proper water supplies. The effect of these mining operations was that the whole land around became honeycombed; and if a reservoir was constructed over such land, it would subside. Therefore, if a reservoir in any part of the county where mining was carried on was to be permanent, it was necessary that the coal underneath should be purchased, which would be very expensive; and even if this were done, the risk would not be altogether gone, as there was another which was equally serious. As coal mining proceeded, springs were tapped and disappeared, with the result that the flow of water into streams became less; and if the reservoir was not affected, the supply decreased as the coal mining went on. Even if they went farther away from the present collieries, there were coalfields and seams not yet worked, but which would be worked later on; and therefore the County Council wished to have power to obtain a supply of water outside the county area. In Glamorganshire there were nineteen urban and fourteen rural districts, and, with two or three exceptions, it might be said of nearly all of them that the water supply at present was insufficient in quantity and unsatisfactory in quality. There were many difficulties in the way of the urban districts making provision for their own water supply; and it had long been thought by those who knew the circumstances that the solution of the problem lay in getting a supply on a considerable scale, and forming combinations or groups of the local authorities which would enable them to bear the expense of going farther afield for their water. The coal areas extended roughly to the northern boundary of Glamorgan county; but beyond this, in Breconshire and Carnarvonshire, there were mountainous districts sparsely populated, with a large rainfall, and suitable for obtaining a considerable supply of water. Swansea had already established a supply from this source; and two other large districts, including Merthyr Tydfil, had done the same. What they had done, the smaller districts, with lower rateable values, could not do, especially those at a distance from the necessary sources of supply. Therefore, if the county was to be saved from what, in the next ten or fifteen years, would be a very serious state of things, it could only be done by the combined operation of the smaller districts; and this could best be effected through the County Council on which each district had its representatives. The matter had engaged the serious attention of the Council almost since its formation in 1888; but until 1903 county councils were not allowed to promote Bills. This power, however, now enabled the Council to bring forward the Bill before the Committee, for the purpose he had indicated. With this object in view, they called a meeting of the Local Authorities and Urban District Councils at the beginning of October last, when the matter was discussed; and it was in consequence of this that the Bill was promoted. Counsel went on to refer to the clauses, and pointed out that they gave the necessary protection to local authorities against undue compulsion, and also enabled them to hold local inquiries as to the necessities of districts, by which application might be made to the County Council; while where districts were supplied by a company authorized by Parliament, they were not to be interfered with so long as they were carrying out their statutory duties. A further clause provided that the Water Committee (when formed) was to be the body to negotiate in respect of the construction of water-works and to carry on the undertaking. With regard to the opposition to the Bill, Counsel pointed out that the extraordinary thing was that, whereas persons inside the county were, with very few exceptions, satisfied with the Bill, there was an enormous amount of opposition from outside bodies who really had no interest in the matter, who were not affected by the provisions of the Bill, and who, from the wording of their petitions, appeared to have entirely misconstrued the powers sought. Almost without exception these petitioners from outside had no *locus standi* at all. The first petition was from the London County Council, and he submitted that they had no *locus standi*.

Mr. BLENNERHASSETT contended that they had, on the ground that the Bill would prevent the carrying out of any scheme for a water supply for London from South Wales, or, at all events, render any scheme difficult of execution.

After some discussion, the Committee disallowed the *locus*, and afterwards gave a similar decision in regard to the Metropolitan Water Board.

The case for the promoters was then continued; evidence being given by the Clerk to the County Council (Mr. Franklen) and the Medical Officer of Health (Dr. Williams).

The hearing was continued on Tuesday and Wednesday, when, after hearing arguments against the Bill, evidence was called in opposition, on the ground that the scheme would prevent other local authorities from obtaining independent supplies of water. In the result,

The CHAIRMAN said the Committee were of opinion that the Bill might proceed, subject to the following conditions: In clause 3, it must be made clear, in accordance with the undertaking of the promoters, that entry upon land for surveying was not to take place without the consent of the occupier. The power to create Water Boards should be taken out of the Bill; and the Committee desired to express a strong opinion that if the Council applied to Parliament for further powers, the Bill should be promoted, if possible, in conjunction with adjoining districts.

On Thursday, the Committee proceeded with the consideration of clauses; and, after various alterations had been made, the Bill was ordered to be reported.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—KING'S BENCH DIVISION.

Friday, May 11.

(*Before the* LORD CHIEF JUSTICE *and Justices* DARLING *and* CHANNELL.)

Ruabon Water Company v. Evans—A Question of Costs.

This was a case stated by the Justices of Denbigh for the purpose of obtaining the opinion of the High Court upon a question of law.

Mr. MACMORRAN, K.C., and Mr. WHITELEY appeared for the Water Company; Mr. GRIFFITH JONES represented the respondent.

Mr. MACMORRAN said the point in dispute arose upon the construction of the Water Company's Act. Proceedings were taken before the Justices to recover the sum of 9s. 6d., being the amount of water-rate in arrear. The defendant admitted that the sum was due, but said it was hard upon him that he should have had proceedings taken against him; and the Justices agreeing with him, they refused to give the Company any costs. The question now was whether, under the circumstances, they had discretion to say they would not give costs; and it turned upon the words of the Act. Section 37 provided that whenever any person neglected to pay any sum due to the Company, they might recover the same, with full costs, in any Court of competent jurisdiction. Section 38 enacted that water rates or rents due to the Company, and all damages, costs, and expenses, might, after the defaulter should have been summoned and an order made, be levied by distress; and any Justice might issue a warrant accordingly. Section 40 provided that any Justice who issued a warrant might order the costs of the proceedings to be paid by the person against whom they were taken. As the costs incurred amounted to 6s., if the Company were deprived of costs it might be it would be better for them to put up with the initial loss than take proceedings to recover arrears.

The LORD CHIEF JUSTICE said it did not follow that in all cases the Company would not get costs.

Mr. MACMORRAN contended that under section 37 the Company were absolutely entitled to costs, and that it was not in the discretion of Justices to grant or refuse them, according to their idea of what was right or wrong.

Their LORDSHIPS, without calling on Mr. Griffith Jones, dismissed the appeal, with costs; holding that the words of the Act were sufficiently wide to give a discretion, and that there was no ground for saying that the Justices had exceeded their jurisdiction in declining to allow costs.

OPENING ROADS WITHOUT CONSENT.

In the King's Bench Division of the High Court of Justice of Ireland, last Thursday, a case bearing on the powers of local authorities in regard to the opening of roads was heard by the Lord Chief Justice in company with all the Justices of the Division. It arose at the relation of Patrick Collins, an employee of the Fermoy Gas Company, who had been convicted and fined for having, without the consent of the Urban District Council, opened a street in the town for the Company's purpose. A conditional order to quash the conviction was obtained, and the motion to make the order absolute had been argued before the Divisional Court. The Lord Chief Justice considered the point involved to be of great importance, and required the parties to re-argue it before a full Court.

The prosecution was instituted under section 9, sub-section 3, of the Summary Jurisdiction Act, 1851, which provides, among other things, that anybody who should dig a hole in any road without the consent of the County Surveyor, or by the authority of a presentment, should be liable to prosecution and fine before the Magistrates at Petty Sessions. By the Fermoy Provisional Order Confirmation Act, 1886, all the power, jurisdiction, and authority over the roads of Fermoy

then vested in the Grand Jury were transferred to the Urban Sanitary Authority of Fermoy. It was contended that the absence of the consent of the County Surveyor and the absence of the authority of a presentment were the essential ingredients in the offence contemplated by the section of the Act of 1851; that, inasmuch as the roads were now vested in an authority which had no power to appoint a County Surveyor or to make a presentment, so far as the streets of Fermoy were concerned the offence under the section had ceased to exist. A dispute arose as to the price of the gas; and it was stated that, in order to enforce the demand for a reduction in price, the Local Authority were endeavouring to prevent the Company from interfering with the streets, and were prosecuting their workmen.

The Lord Chief Justice, in giving judgment, said the question to be decided was whether the person summoned was amenable to the Summary Jurisdiction Act, notwithstanding that Fermoy had been made a separate area, and all the functions of the County Surveyor has been superseded so far as related to the point at issue. He was of opinion that the defendant in the summons still remained amenable to the section; his ground for so holding being that all the functions of the County Surveyor, exercised by him as an officer of the Grand Jury, were now vested in the Urban District Council, and that they were, as related to the matter in question, the representatives of the Grand Jury and the County Surveyor. Inasmuch as no consent was given by the Council—the work was, indeed, done against their consent—the defendant was liable to be, and was rightly, convicted. The other members of the Court concurred; and the conditional order was discharged, but without costs.

POLLUTION OF AN EDINBURGH BREWERY WELL.

In the Second Division of the Court of Session on Saturday, the action was called in which Messrs. James Muir and Son, Limited, Calton Hill Brewery, Edinburgh, sue the Edinburgh and Leith Gas Commissioners for £10,000 as damages for the alleged pollution of a well in their brewery, by discharges from the now disused gas-works belonging to the Commissioners in New Street, Edinburgh. In the Outer House, Lord Ardwall gave decree for £3730. When the case was argued before the Second Division some weeks ago, on a reclaiming note by the defenders (as reported in the "JOURNAL" on the 13th of February and the 6th of March), the pursuers were allowed to amend their case, and the defenders to lodge answers to the amendments, if so advised.

Mr. J. D. MILLAR, for the Commissioners, now moved for an adjournment of the case.

The LORD JUSTICE-CLERK pointed out that they could consider anything of a formal nature which might be proposed, but the Bench was not the same as had heard the arguments, and they could not go into the merits.

Mr. GUTHRIE, K.C., for the pursuers, said he was afraid some discussion would be required, because he understood that the motion was that, without indicating what length of time would be required, the other side wished a postponement in order to enable them to make further investigations. But if his friend could say the limit of the delay he desired, they might agree to it. They were anxious the matter should be disposed of at the earliest possible date, and he thought their reasonable interest was that if there was to be further proof, it should be taken, and the case disposed of this session.

Mr. MILLAR said the defenders were anxious that the matter should be disposed of; but their Lordships would remember that they indicated to the Court that it would be necessary to make investigations of a somewhat extensive nature. Immediately after the interlocutor of the 7th of March, the investigation was at once begun. It took the form of the sinking of a well to the lower strata, which were said to be polluted by stuff coming in from the defenders' works. It was thought that one well, if sufficiently large, would enable them to get the information they desired without sinking others. The sinking of the well was started within ten days after the 7th of March, and the work had been going on continuously since. He understood that good progress was being made, and that, so far, there was no sign of pollution. When they got sufficiently far down, they would run a mine in the stratum which was said to be the polluting one. They had succeeded in sinking the well already to a depth of 54 feet. At the rate at which they were going, they would not get to the 183-feet level, which was the polluting level, before the end of the summer session; and after that they would require to drive lateral shafts, so as to make the investigation complete. The Commissioners were now faced with a most serious charge, and they were anxious that their investigations should be of an entirely conclusive nature.

Mr. GUTHRIE said they understood they were to be taken along with the defenders in their operations; but, instead of this, they had been refused all access to the well, and had been told that they could only see the work after it was fully completed.

The LORD JUSTICE-CLERK said the Court could not go on with the case, and must adjourn it; but he suggested that the parties might arrange about the pursuers getting access to the well.

Mr. MILLAR said defenders were anxious to give every facility.

The case then stood over till the return of Lord Stormonth-Darling, who was present at the former hearing.

The Kent County Gaslight and Coke Company has been registered with a capital of £50,000, in £5 shares (6000 preference), to adopt an agreement with Messrs. F. C. Lawson and Co. for the acquisition of the Goudhurst Gas-Works, and to carry on the business of producers and suppliers of gas, &c.

Owing, it is thought, to the ignition of vapour from a carbolic still, a serious explosion, followed by a fire, occurred on Thursday night at the chemical works of Sadler and Co. at Middlesbrough. Several men were injured, and unfortunately one, 65 years of age, was killed. The fire was confined to the benzol department.

MISCELLANEOUS NEWS.

PARIS GAS COMPANY.

Report and Accounts for the Last Year of the Concession (1905).

Our readers are aware that the concession granted to the Paris Gas Company expired on the 31st of December last, and that the undertaking is now being carried on by Liquidators, pending the settlement of the question of the future control of the gas supply of the city. Their duties necessarily included the presentation to the shareholders of the results of the past year's working; and this they did at a general meeting held a few weeks ago. In order to allow of comparison with previous reports, the statistical and other particulars were given in the form and sequence which have been customary for some years.

In the twelve months which closed on the above-named date, there were sent from the Company's works 394,916,259 cubic metres, or nearly 13,950 million cubic feet, of gas, compared with 379,740,238 cubic metres, or rather more than 13,404¾ millions, in the preceding year; being an increase of 15,176,021 cubic metres, or equal to 4 per cent. of the total production in 1904. In that year the day consumption was 152,752,160 cubic metres, or nearly 5392¼ million cubic feet; whereas last year it was 162,584,170 cubic metres—an increase of 9,832,010 cubic metres, or 6·05 per cent. of the day consumption in 1904. The quantity of gas used in the daytime was 41·17 per cent. of the total output. The revenue from the sale of gas amounted to 105,874,776 frs. (£4,234,991), or 3,674,675 frs. (£146,987) more than in 1904. Of the total receipts, 96,219,750 frs. came from the city, and 9,655,026 frs. from the out-districts. The consumers at the close of the year numbered 579 388, compared with 553,979 at the end of 1904. They were divided into two classes: Ordinary, 343,186; and "free-fitting," 236,202. The preceding year the numbers were 334,029 and 219,950; so that there was an increase of 9157 in the former and 16,252 in the latter—a total of 25,409, against 26,993 for the year 1904.

The number of burners in the public lamps at the end of last December was 66,691, of which 54,215 were employed in lighting the city and 12,476 were in use in the suburbs; being an increase of 244 in Paris itself and of 13 in the out-districts. The extent to which the different kinds of burners are employed is shown below.

Kind of Burner.	1904.	1905.	Inc.	Dec.
Ordinary	2,286	2,013	—	273
Incandescent	51,519	52,202	683	—
Regenerative	166	—	—	166
Total	53,971	54,215	683	439

The number of rising mains laid on last year was 1276; bringing up the total to 54,676. The consumers served from them at the close of the year numbered 431,839, or 24,884 more than at the corresponding time in 1904. The proportion of consumers supplied in this way on Dec. 31 last was 74·53 per cent. of the total, compared with 73·46 per cent. twelve months previously.

With regard to the works and plant, the distribution system was extended by about 38,000 yards, of which 6000 yards were in Paris and 32,000 yards in the suburbs. The greater portion of the mains laid in the out-districts were put down at the request of the new Company who have taken over the supply of gas, who, of course, bore the expense. The total length of mains in use was about 1560 miles. During the year there was a net sum of 435,849 frs. (£17,434) expended for capital purposes; and at the close the account stood as follows:—

	Francs.	Sterling.
Amount expended to Dec. 31, 1904	339,157,365	£13,566,295
,, ,, during 1905	435,849	17,434
Total	339,593,214	£13,583,729

To meet this there has been raised: By shares, 84,000,000 frs.; by bonds, 254,004,189 frs.—together, 338,004,189 frs. To this total must be added a sum of 2,246,799 frs. taken from the revenue in 1900 to meet capital expenditure in excess of 3,200,000 frs.; making in all 340,250,988 frs. (£13,610,039). There is consequently a disposable balance of 657,774 frs. (£26,310). The capital was represented by 336,000 shares and 553,332 bonds, all of which had been redeemed before, or would be after, the 1st of January last.

The following is the working account for the past year:—

Expenditure.

	Francs.	Sterling.
Value of gas in store on Jan. 1, 1905	73,189	£2,928
Manufacture of gas—		
Carbonizing material	25,402,599	1,016,104
Coke and tar for heating purposes	5,614,895	224,596
Salaries and wages	5,865,460	234,618
Maintenance of works and plant	2,003,819	80,153
Incidental expenses of carbonization	1,654,088	66,163
Purifying materials and labour	420,089	16,803
Distribution—		
Salaries of Engineers and officers	2,531,331	101,253
Repairs, &c., of mains and services	1,989,214	79,569
Miscellaneous expenses, stamps, &c.	633,007	25,320
Gratuitous installations of fittings, &c.	582,669	23,307
General management (including interest and sinking fund payments)	26,503,965	1,060,159
Pension and provident funds	2,936,883	117,475
Municipal charges—		
Tax of 2 c. per cub. met. of gas sold	6,812,304	272,492
Rent of subsoil occupied by mains, &c.	200,000	8,000
Lighting, extinguishing, and maintenance of public lamps (less amount paid by Municipality)	1,441,740	57,670
State charges—		
Official gas testing, stamps, &c.	1,213,446	48,538
Total expenditure	85,878,698	£3,435,148

Revenue.

	Francs.	Sterling.
Value of gas in store on Dec. 31, 1905	72,827	£2,913
Sale of gas	106,122,878	4,244,915
Residual products—		
Coke	15,456,910	618,276
Tar	2,454,470	98,179
Ammoniacal liquor	2,662,691	106,508
Rental of meters and fittings on hire	3,285,900	131,436
Interest and discount	1,122,462	44,898
Total revenue	131,178,138	£5,247,125
Deduct expenditure	85,878,698	3,435,148
Balance, profit for 1905	45,299,440	£1,811,977
Add balance from 1904	399,981	15,999
	45,699,421	£1,827,976
Deduct to meet outstanding claims	551,319	22,052
Balance available for distribution	45,148,102	£1,805,924
Deduct for share dividend	11,200,000	448,000
	33,948,102	£1,357,924
Deduct amount due to the Municipality as compensation for the reduction in the price of gas in the suburbs	248,102	9,924
Balance, divisible equally between the Company and the Municipality	33,700,000	£1,348,000

The Municipality's share will therefore be—

	Francs.	Sterling.
Half of divisible balance	16,850,000	£674,000
Compensation for reduction in price	248,102	9,924
Total	17,098,102	£683,924
Deduct to meet liquidation expenses	3,250,000	130,000
Balance	13,848,102	£553,924

The total amount going to the shareholders is—

	Francs.	Sterling.
Dividend as above	11,200,000	£448,000
Half of divisible balance	16,850,000	674,000
Placed to shareholders' credit, as per resolution of March 23, 1875	50,000	2,000
Balance of undivided profits	392,777	15,711
Total	28,492,777	£1,139,711
Deduct 1 fr. per share for reserve fund (336,000 frs.) and 3,250,000 frs. to meet liquidation expenses	3,586,000	143,440
Balance	24,906,777	£996,271
Deduct interim dividend of 12 frs. 50 c. per share paid in October last	247,037	168,013
Do. for redemption of shares, as per order of the State Council of May 12, 1900	3,953,293	
Balance	20,706,447	£828,258

This allowed of the payment of a final dividend of 61 frs. per share, making 73 frs. 50 c. for the year; leaving a balance of 210,447 frs. (£8418) to be carried forward.

Following the accounts is the portion of the report dealing with the residual products and the gas-engine business. The revenue from the sale of coke was lower by 76,246 frs. (£3050) than it was in 1904; and there was a decrease of 449,403 frs. (£17,976) in the returns from tar and chemical products. On the 31st of December last, there were at work in Paris and the suburbs 3694 gas-engines, with a total of 18,187-horse power. The quantity of gas consumed by them was 14,001,294 cubic metres, or about 494¼ million cubic feet; being an increase of nearly 15 millions on the consumption in 1904.

As usual, particulars are furnished in regard to the provident, pension, and savings funds. Last year the expenses of the provident fund amounted to 679,502 frs. (£27,180), whereas the receipts were only 435,223 frs. (£17,409); leaving a deficiency of 244,279 frs. (£9771), which was chargeable to the working account for the year. There are two pension funds—one for the workmen and the other for the clerks and officers. The amount of the former on Dec. 31 last was 2,906,568 frs. (£116,263), and of the latter 17,426,799 frs. (£697,072). The balance of the savings fund at the close of the year was 297,289 frs. (£11,891), or 13,221 frs. (£529) less than at the corresponding period of 1904.

The remainder of the report is devoted to a review of the circumstances which led to the decision of the Municipal Council to have the undertaking carried on by the Liquidators of the Company under a provisional arrangement operative for the current year.

Gas Profits at Darwen.—At the monthly meeting of the Darwen Town Council on Monday last week, Mr. T. Duxbury introduced a resolution by which he sought to put a stop to the automatic transfer of gas profits to the general district fund for the relief of the rates. He argued that gas consumers had to pay the rates in full and contribute to the profits of the Gas Department, which, when transferred to the relief of the rates, became advantageous to those who did not use gas. Such a system, he urged, was unfair to the poor people of the town, to whom gas was the only means of artificial light. It would be better for the gas profits to be used for the reduction of the capital invested in the undertaking, which was far too high; and when the rainy day came in the matter of trade, they could reduce the price of gas. Several councillors supported the resolution; but Alderman Tomlinson opposed it—arguing that a man who did not go into the parks could not claim to be exempt from paying towards their upkeep. The resolution was defeated by a large majority.

LIGHTING OF OXFORD STREET.

Question of Gas or Electricity again Adjourned.

The Marylebone Borough Council resumed on Thursday evening the consideration of the recommendation of the Lighting Committee, adjourned from a meeting held on the 26th ult. (*ante*, p. 323), "That the tender of the Gaslight and Coke Company for the lighting of Oxford Street from Tottenham Court Road to the Marble Arch for five years be accepted." It may be remembered that on the previous occasion, Mr. Fowler, the Chairman of the Committee, moved the adoption of the report and recommendation, and spoke warmly in support of his motion.

Alderman ANGLIM now moved, as an amendment—"That the report be referred back to the Committee for further consideration." He said he wished it to be distinctly understood that he did not approach the subject in any spirit of opposition to the Lighting Committee, who he was sure were animated by a desire to do what was best for the borough and the ratepayers. He suggested that if the amendment was carried a conference should be arranged between the two Committees. So far as he was concerned, he had always been in favour of the electric light; but he was not in favour of it at any price, and if he were convinced that gas was really the better and cheaper illuminant for Oxford Street, he would support the Committee's recommendation. He was informed that, on the two estimates which had been before the Lighting Committee, twice the amount of light was offered in the electricity tender. He had an absolutely open mind on the question, and only desired fair play for each illuminant.

Dr. LEAF, in seconding the amendment, said there appeared to have been some misapprehension on the part of the Lighting Committee with regard to the candle power. The total maximum illuminating power of the electric lamps proposed to be put up was 340,000 candles, and the medium 222,000 candles; whereas the maximum power of the gas-lamps was only 117,200 candles. The Electricity Committee, he was authorized to say, were now willing to do the whole thing at the same price as gas, including the repayment of the capital charge. Gas companies were everywhere pushing their business by means of advertisements in the most active way; and there could not be the least doubt that if the Council accepted the Gas Company's tender for the lighting of Oxford Street the fact would be put before the people in the most prominent way possible, and would have a considerable effect upon the public mind. The result would be adverse not only to the Marylebone electricity undertaking, but to electric lighting concerns everywhere throughout the country. Members had only to remember the prominent way in which the lighting of Aldwych and the lighting of the City of London had been advertised by the Gas Company, to understand the use to which the Marylebone contract would be put. Already the fact was being prominently put forward that a Committee of the Council had recommended gas for the lighting of Oxford Street. In this connection, he might point out that the gas companies were combining to advertise gas as against electricity; and it really became a serious question whether municipalities and companies should not join in the same way to advertise electricity. At any rate, it was the duty of the Council, in the interests of their undertaking, to keep this very effective advertisement out of the hands of the gas companies. It would be well worth their while to supply electricity for the lighting of Oxford Street at cost price in order to prevent the Gas Company from coming in. According to the modified offer of the Electricity Committee, they would supply double the amount of light for the same price as the Gas Company.

Mr. DUNN said it was to be remembered that at the last meeting it was pointed out that the whole of the cost of electricity was not disclosed in the report. There was a sum of £3000 or £4000 for breaking up the streets, which did not appear, as well as several other items. If there were a loss—and there was almost sure to be—on the lighting of Oxford Street by electricity at the price proposed, it would fall on the ratepayers. The whole question was one of dignity. Certain councillors did not think it would be dignified to accept an outside tender. If these gentlemen had their way, the ratepayers would have to pay very high for the dignity of councillors.

Mr. BRINSLEY-HARPER contended that it would be an unfortunate thing for the electricity undertaking if the Gas Company's contract were accepted. The Westminster Council were responsible for one side of the street; and if there were a loss, Westminster would bear one-half the cost. There would be great advances and economies in electric lighting within five years, which was the period of the Gas Company's contract. The cost of electricity could be reduced by getting (as Stepney and St. Pancras had done) the loan for lamp-posts to be repayable in twenty years, instead of ten years, as proposed in the report.

Colonel HOPKINS argued that the tender of the Electricity Committee provided for 40 per cent. more light than the other. The Gaslight and Coke Company were everywhere actively pushing their business. If a man built new houses nowadays, he could get practically the whole of the piping put in by the Company for nothing. Some buildings he (the speaker) was erecting were having the pipes put in by the Gas Company at £1 per house. [A MEMBER: Why not?] He mentioned the fact as illustrating how far the Company went to obtain business, and to show that they relied for their profit, not upon the installation, but on the sale of gas. He was afraid that if the Council accepted the tender of the Company, at the end of five years they would put up the price.

Mr. MARTIN MORRIS said it did not appear to him to be quite fair competition to permit the Electricity Committee to alter their tender at this juncture. There could be no doubt in the minds of anyone who went thoroughly into the subject, that gas was the best illuminant for street lighting. It distributed the light more evenly, and threw it on to the pavement where it was wanted, not high up in the heavens where it was not wanted. He found the principal reason why members opposed the recommendation of the Lighting Committee was because they were afraid if it were adopted they would look ridiculous

after paying what they did to acquire the electric light undertaking. Fear of ridicule outweighed, in some minds, the certain loss to the ratepayers if gas was rejected. If electricity was the good thing for the lighting of Oxford Street it was represented to be, Why was it not proposed to extend it along the Edgware Road and up Maida Vale and other localities?

Sir THOMAS BROOK-HITCHING was of opinion that it would be a great mistake to go in for gas lighting, as during the next five years there would be great improvements in the electric light. In Paris, some of the streets were illuminated with gas. But, speaking generally, electricity was chiefly used on the Continent and in America for the lighting of the main streets; and where gas had been installed, there was a movement on foot to go back to electricity.

Mr. J. LEWIS, as a business man, favoured the adoption of the recommendation of the Lighting Committee. Whatever advantages electricity had for internal lighting, there could, he said, be no question in the mind of any impartial person that gas was best for outdoor purposes. It would only handicap the undertaking to accept the tender of the Electricity Committee at the price mentioned. He hoped the matter would go back to the Lighting Committee, because he was certain that the more the subject was considered, the more the Committee would be confirmed in their decision in favour of gas.

Mr. FOWLER said, on behalf of the Lighting Committee, he had no objection to the report being referred back. He was confident, however, that the only result would be that the members would see more clearly the advantages of accepting the Gas Company's tender. Complaint had been made as to the manner in which he had put before the Council the candle power of the rival illuminants; but he contended that the method he had adopted was the best and the fairest. He had no personal feeling in the matter, and he was absolutely convinced that the more the subject was discussed the more clearly the fact would come out that electricity stood no chance against gas for street lighting. [A MEMBER: Nonsense.] It was not nonsense, as the gentleman who had interrupted would find out if he would only go into the matter as thoroughly as he (the speaker) had done. Reference had also been made to the fact that the report had been carried in Committee only by the casting vote of the Chairman. This was so; but if all the members of the Committee had been present, the voting would have been seven for gas and four for electricity. He had given his casting vote so that the matter should be speedily decided, for the traders of Oxford Street urgently needed an improvement in the lighting of that thoroughfare, and it was necessary, in order that the work should be completed before next winter, that operations should be commenced at once. The Electricity Committee had been allowed to amend their tender, and he thought that, in fairness, the Gas Company should also be permitted, if they chose, to alter their figures. Mr. Wright, their Consulting Electrical Engineer, who was one of the foremost electrical experts in the world, had told him (the speaker) that he was against the lighting of Oxford Street by electricity. It was only at the instigation of the Electricity Committee that he had been compelled to see the advantages of electricity for Oxford Street.

The MAYOR (Alderman Dennis) said that, no matter what decision was finally arrived at, the Council and the borough were deeply indebted to Mr. Fowler for the enormous amount of time he had given to this question. He had gone into it most thoroughly.

The report was then, by consent, referred back to the Committee for further consideration.

GAS v. ELECTRICITY IN KENSINGTON.

Council Unanimous for Gas.

At the Meeting of the Kensington Borough Council last Tuesday a letter was received from the Kensington and Knightsbridge Electric Lighting Company, with reference to an offer made by them to substitute 36 electric arc lamps for certain incandescent gas-lamps in South Kensington, and stating that, in the event of the Council being prepared to re-open the matter, they would be willing to supply and erect the lamps with all necessary fittings, the Council paying at the rate of 1½d. per unit for the current for not less than 3600 hours per lamp per annum, representing a minimum charge of £7 1s. 9d. per lamp per annum. The Company further stated that they would be prepared to carbon, clean, and maintain the lamps at a further charge of 1½d. per unit, making a total of £14 3s. 6d. per lamp per annum. The proposal in either case was subject to a contract being entered into for five years. The Works Committee, reporting on the letter, pointed out that the present cost of lighting the area in question was estimated at £550 per annum. This sum, as compared with the Company's estimated figure—viz., £510 6s. per annum—showed a saving of £39 14s. in the lighting of the district in favour of the proposal. The Committee, however, did not deem it advisable that the Council should enter into such a contract as the one proposed for a period of five years, looking to the fact that proposals are constantly being made as to improvements in public street lighting. Doubts had arisen as to whether the light proposed would be found suitable for purely residential streets; dissatisfaction having already been expressed in certain quarters with the trial lighting in Palace Gate. After fully considering the matter, and having regard to the fact that the figures quoted by the Company are minimum estimates only, and that the area in question is at present well lighted, the Committee recommended that the Company should be informed that the Council do not deem it expedient to accept the offer. The report and recommendation were adopted without dissent or discussion.

Reduced Price of Gas for Power at Carnarvon.—We learn from Mr. W. M. Ruxton, the Engineer and Manager of the Carnarvon Corporation Gas Department, that at the recent annual meeting, reported in the "JOURNAL" last week (p. 386), in addition to the reduction of 3d. per 1000 cubic feet in the price of gas for lighting and cooking purposes mentioned, the charge for gas used for power was lowered from 3s. 3d. to 2s. 9d. per 1000 cubic feet.

DEVONPORT GAS-WORKS EXTENSION.

"Abandonment" of the Scheme.

At a Meeting of the Devonport Town Council last Thursday, the Gas Committee presented a report on the subject of the scheme for the extension of the gas-works, which has been partly carried out under the direction of Messrs. Stevenson and Burstal as Consulting Engineers. It appeared from this report that the Town Clerk had interviewed these gentlemen and their Solicitors, and had informed them of the intention of the Committee to abandon the remaining works, to the value of £32,000, mentioned in the Engineers' report, which the Council adopted in July, 1902, and that he had provisionally arranged for them to terminate their retainer on payment of £850—all plans, estimates, and other documents relating to the works being handed over to the Corporation. The Town Clerk having advised the Committee as to their legal position, they resolved that the Engineers be paid £850 upon their agreeing to terminate their retainer, and that the amount be borrowed.

Alderman HORNBROOK, the Chairman of the Gas Committee, in moving the confirmation of this report, remarked that he was in a rather difficult position. If he said nothing, he might be criticized because he did not explain; and if he did explain, somebody might turn round and say, "It would have been all right if you had said nothing." He thought, however, he should have used in the report the word "postpone," instead of "abandon."

The TOWN CLERK: "Abandon" is the proper word.

Alderman HORNBROOK said he had his opinion on the matter. He wished the word "abandon" had been used very much earlier. This, he thought, was as far as it was necessary for him to go on the present occasion. It might be considered that the Committee had arrived at their decision without careful thought and judgment. This was not the case. They had gone into the matter very seriously, and for reasons which were obvious to them, he was sure this was the best plan that could be suggested.

Mr. R. H. RENDLE thought the word "postpone" should be used, and not "abandon." It was the pivot of the whole thing, because if the work was postponed, as he understood it was, there was no necessity for giving the Consulting Engineers the £850. When the arrangement was made with them, no period was fixed for the completion of the work; and the Council could postpone it. He was a member of the Gas Committee at the time, and it was because of this arrangement that he left. He then thought they were spending too much money, and acceding too readily to the wishes of the Engineers. His idea was that the day would come when they would regret it; and it had come. It seemed to him £850 was to be given to the Engineers for no cause whatever.

Mr. R. D. MONK said that for once he should like to congratulate the Committee on the practical issue of their work.

The report was adopted.

BURTON-UPON-TRENT GAS AND ELECTRICITY WORKS.

The Past Year's Operations.

At the Monthly Meeting of the Burton-upon-Trent Town Council last Wednesday, the annual reports on the gas and electricity undertakings were presented by the Mayor (Alderman T. E. Lowe), as Chairman of the Committee; and he had a gratifying task to perform.

Dealing first with the gas, he remarked that they regarded the statement as a satisfactory one. The year's trading had resulted in their having a surplus of £1363 to hand over to the reserve fund, after making the handsome contribution of £6500 to the rates. This was a result on which he congratulated both Mr. Sydney Ramsden and his father. He would not congratulate the Committee, for fear of hurting the susceptibilities of members of the Council; but he was sure they would all rejoice that the profits had maintained such a high level. This result had been obtained after paying such sums as £1555 for the diversion of the main sewer, and putting a considerable amount on one side for meters, &c. The prepayment meter continued to be popular; and they had 220 additional customers during the year, as against 63 ordinary meters. It was a matter for regret that the sale of gas during the twelve months had decreased by 14 million cubic feet. This was accounted for by the depression in trade. He would not attempt to prophecy; but he might express the hope that there would be a turn in the tide in the not distant future. He was glad to say the reserve fund stood at the substantial sum of £13,484, and the depreciation fund at £11,291; so that these funds together amounted to £24,775. The financial position of the undertaking was a strong one; and if the same cautious policy was continued, they might soon hope to reduce the price of gas.

He was also glad to be able to make a statement in reference to the Electricity Department which, he was sure, would be gratifying to the Council. Those members who had carefully studied the report of the Tramway Committee would see that a considerable saving had been effected by the department in the use of electricity for power purposes. They had used 66,000 units less than last year. It might have been supposed that this would have had a prejudicial effect on the profits of the Electricity Department; but this was not the case. The units sold for lighting had maintained a steady increase, in face of the bad trade, which they must regard as satisfactory; and the amount sold for power had gone up in much larger proportion. They would like to bring home to the manufacturers of the town the great advantages which the Committee offered them for power. There was a steady increase in this direction; and the more consumers they supplied with power, the cheaper they would be able to sell it. The chief reason the Committee were able to show results much better than last year was that the works cost had been steadily brought down; and the repairs to the plant and mains had been much less. The result was that they

were able to put £1073 to the renewal fund, after spending more than £300 in the change of voltage.

The reports were both of them adopted unanimously.

The receipts from the sale of gas for the twelve months ending March 31 amounted to £40,785, as compared with £42,194 in the previous year; from street lighting, to £4867, against £4770; meter and stove rents, to £1220, against £1240; coke, tar, lime, carbon, concentrated ammoniacal liquor, and oxide to £11,631, against £12,643. Other items—interest, stores, &c.—brought the total receipts up to £59,612, as compared with £61,604 in 1904-5. On the other side of the account, coal cost £15,738, against £18,047; carbonizing wages and unloading, £4962, against £5075; purification, £1104, against £960; maintenance and general repairs of works, £3489, against £3663; renewal and repair of retorts, £1584, against £1591; repairs to mains and services, £1714, against £1986; repairs to meters and stoves, £1556, against £2446; rents, rates, taxes, and insurance, £3658, against £3695; street lighting, £1591, against £1464; and interest on, and repayment of, loans and stock, £9560, against £9559. Out of the profits, £6500 has been contributed in relief of the rates, as against £5000, £1300 has been placed to the depreciation fund, and £1363 has been put to reserve.

GAS-WORKS PROFITS AT ROCHDALE.

The Reserve Fund and the Rates.

It was stated in last week's "JOURNAL" that the Rochdale Gas Committee had decided to recommend the Town Council to place £5000 of last year's profits to the reserve fund, and devote the balance to the relief of the rates. This course, however, does not seem to have been agreed to, judging from a debate that took place subsequently in the Council. On this occasion, Mr. Walker, the Chairman of the Gas Committee, in moving the adoption of the minutes of his Committee, referred at length to the subject of the disposal of the profits of the gas and electricity works. He remarked that the Council had pursued a most unwise policy hitherto with regard to the gas undertaking; and he regretted that they had already commenced the same policy with reference to the electricity works.

Mr. Walker said that, considering the Council in committee had decided to appropriate the whole of the gas profits in aid of the rates, it was most desirable that they should put on record some important facts in reference to the financial position of the department The debt on March 31, 1905, was £225,256, of which £164,956 represented the debt on the older portion of the works, and £60,300 on the portion erected since 1893. At March 31, 1905, the sinking fund amounted to £23,644, towards the repayment of £164,956, which had been accumulating since 1882; and some forty years had still to elapse before the full amount would be provided. The retort-house, which required reconstruction—the Council had been repeatedly informed of this—represented a considerable proportion of the old debt, and ought therefore to be maintained as a reliable asset until paid for. At present it was not; and the yearly patching-up process was expending money on an out-of-date apparatus. Until funds were provided out of revenue to reconstruct it, it could not be made a reliable asset. It was true that various sums had been set aside from time to time for this purpose; but they had never been allowed to remain intact until a sufficient amount had accumulated to deal with the matter satisfactorily. They had been appropriated to the rates whenever there was a prospect of an increase, as was the case this year. Since 1900, there had been practically no contribution to the reserve fund for reconstruction purposes; for though £5500 was added in 1903, and £1825 in 1904, there had been £7728 taken out in aid of the rates during the same period. The credit on the reserve fund at March, 1900, was £17,373; and in 1905, £17,199. About £13,000 of this had been spent on the water-gas plant, which had replaced about one-fourth of the retort-house; and the remainder still continued in the dilapidated state to which attention had so frequently been called. The cost of the reconstruction of the remainder in accordance with modern requirements, would probably amount to £24,000 or £25,000. They were operating a certain proportion of the gas-works with machinery which was absolutely out-of-date—rotten; and they were still patching up machinery which was not worth it. Besides the retort-house, other portions of the plant were, of course, similarly deteriorating; and though it was possible to provide for some of this year by year, it was not so in all cases. Funds ought to be available to meet these contingencies; but no such provision could be made so long as the Council continually decided that it was more important to assist the rates than to get the gas undertaking into an efficient, business-like, and satisfactory condition. He made these statements because he wanted the outside public to understand the position, and also in justice to the Manager (Mr. T. B. Ball), who, from time to time, in the interests of the undertaking, had called attention to the unsatisfactory manner in which the Council were dealing with the finances of the Gas Department.

The next speaker, Mr. Ogden, also considered it was due to the Gas Department to make it known that they had had the profits unduly extracted with a view to assisting the rates, when those profits could with advantage have been given to the consolidation and improvement of the works. The fact remained that the amount of rates for one year had been abstracted from the profits of the department during the last six years. This could not continue. Mr. Walker had not told them that in all probability the profits would be less, by reason of the reductions that had been made in the price of gas. He (the speaker) calculated that the reduction in the price of coke would make a difference of £1000 per year, and he believed in twelve years it would have affected them to the tune of £3000 or £4000 more; so this of necessity would reduce the amount which the General Purposes Committee would have to handle from the department. There were perhaps two or three ways of meeting a contingency of this sort. They might borrow, or they could build up a renewal or reserve fund in order to replace any plant which might be worked at a disadvantage. Another way would be for the Committee to undertake to expend the necessary money in repairs or renewals before the amount of profits was realized. He hoped the Council would not drive the Committee to this position; but he contended, as a member of the Committee, that they had a duty to the undertaking and to the ratepayers to maintain the works in the most efficient position possible. The spending departments would have to find fresh avenues of income, or would now have to cut their coat according to their cloth.

Mr. Blomley remarked that he believed Mr. Ball had said that the Rochdale Gas-Works would compare favourably with those of any other corporation in the country; while Mr. Davidson stated that Mr. Walker had not convinced him that the undertaking was starved. They had, Mr. Davidson pointed out, written off £21,000 for depreciation on the works and plant; and they had spent £50,000 out of reserve on the upkeep of the plant and buildings, which was practically the equivalent of a provision for depreciation. They had also spent £4500 on repairs.

The Mayor (Mr. Jones) observed that, in his desire to look after his own department, Mr. Walker had gone a little farther in his remarks than was wise. It had the effect of depreciating the assets of the town; and personally he did not agree with a great deal that the Chairman of the Committee had said. He believed in having a good depreciation or reserve fund—it was necessary. But sometimes the Council were fairly entitled to a share of the profits. They were entitled to it this year, not only because of their necessities, but because this year the Gas Committee had spent out of the reserve fund £20,000; and surely this was a good proportion for one year. It was written off the reserve fund, certainly; but it appeared on the other side among the assets in the shape of a plant which had cost from £10,000 to £12,000. He had asked Mr. Ball how the gas-works stood in comparison with those of other corporations; and he replied that they stood at as reasonable a figure regarding cost as any in the country, and were capable of producing as many thousand feet of gas for the capital that was laid out. Having regard to these circumstances, they ought not to let it go forth from the Council—because they were a little sore at the profits being taken from them—that the works were in an uneconomical condition for production.

The minutes were passed, with the exception of so much as related to the sums to be carried to the credit of the reserve fund.

MUNICIPAL UNDERTAKINGS AT RHYL.

A Continuous Loss on Electricity.

In the course of his budget speech, Mr. H. A. Tilby, the Chairman of the Finance Committee of the Rhyl Urban District Council, referring to the trading undertakings, said the Gas Committee, under the energetic direction of Mr. Leonard G. Hall, the Engineer, were to be heartily congratulated on another year of successful working. The profit was no less than £1043; while, in addition to this, a sum of £406 was paid off on cookers account. Taking all the facts into consideration, there could no longer be any reasonable doubt that in this concern the ratepayers had a very valuable asset; but, to make assurance doubly sure, he would again urge that at the earliest possible moment—that was, as soon as the whole profits were not needed to diminish the losses on the electric light and water undertakings—it should be the business of the Committee to set aside a reserve fund in order to meet expenditure on capital account. The water undertaking had proved in one respect better than they had anticipated a twelvemonth ago. At that time, owing to a further capital outlay of £7000, they calculated on a loss of £709; but the actual loss had turned out to be £446. This was so far satisfactory; but as they found it necessary to borrow a further sum of £1300 for the new reservoir, they estimated a loss for the coming year of £622, which amount would, in accordance with the policy decided upon some two years ago, be met from the Council's other concerns, and from the rates. He looked forward confidently to the time when the water undertaking would pay its way; but when he came to the electric light works, he could see nothing that gave him cause for optimism. He added: "The concern has gone from bad to worse. In 1904, we lost £475; in 1905, we lost £831; and in the year just ended, we have lost £1118. In spite of substantial contributions from the rates, the debt on the revenue account now stands at £2258; and to make matters worse, we anticipate a loss during the current year of no less a sum than £1151. From this it would appear that the longer we work the undertaking the larger grows the annual loss. I think this surely must constitute something approaching a record failure; and I strongly advise that steps be taken by the Committee to see if some improvement is not possible. The cost of working is so much greater than we were led to believe, that I think the cost which would be involved by the engagement of an outside expert to report on the working would not be grudged by the Council."

In the course of the discussion which followed, Mr. Ellis said the officials ought to be thanked for having exercised such economy in the various departments during the past year; and more especially did he mention the Gas Engineer. It was no small accomplishment to make a profit of over £1000 in the Gas Department. Perhaps the gas consumers ought to have some relief; but still he thought they were quite willing to make a sacrifice in order to keep the general district rate down. Like Mr. Tilby, he deplored the shortcomings of the Electricity Department, though he agreed that they could not have a more competent man at the head of the Electric Light Committee.

Resignation of the Shrewsbury Water Committee.—As the result of the decision of the electors of Shrewsbury in regard to the upland water scheme, which, as reported last week (p. 394), they rejected by a large majority, the members of the Water Committee of the Town Council, with three exceptions, have tendered their resignations. It will be seen, from our "Parliamentary Intelligence" to-day, that the Bill introduced to sanction the carrying out of this scheme has been withdrawn.

WELSBACH INCANDESCENT GASLIGHT COMPANY.

The Annual Report.

In the "JOURNAL" last week, we briefly indicated the recommendation of the Directors of the Welsbach Company in regard to dividends which will be submitted for the approval of the shareholders at the annual general meeting to-day. In the report in which they are contained, the Directors state that the net profit of the whole undertaking for the year ending March 31, including the dividend for the year 1904-5 upon the Company's holding in the Austrian Company, amounts to £84,899. To this must be added £10,576 brought from last year; making in all £95,475. There is now no debenture interest to charge. After deducting the interim dividend for the half year upon the 6 per cent. preference shares, which was paid on the 1st of January, there remains to be dealt with £77,478; and the Board recommend that it should be applied as follows: In paying a final dividend after the rate of 6 per cent. per annum on the preference shares, £17,999; in paying a dividend of 5 per cent. upon the ordinary shares for the whole year, £37,158; in adding to the general reserve a sum of £15,000; and in carrying to the credit of next year the balance of £7321. The sum of £15,000 now proposed to be added to the reserve fund will bring it up to £75,000; and £15,300 Mersey Docks and Harbour Board 3½ per cent. debenture stock now held by the Company will be allocated thereto. The present market value of the reserve fund investments is in excess of the price at which they stand in the books.

The volume of the Company's business has, it is said, substantially increased; but, as regards resulting profits, not sufficiently to make up for the 25 per cent. reduction in the price of mantles necessitated by the conditions of the trade, and put into operation a year ago.

During the year, 10 more shares in the Austrian Company were bought; raising the holding in that Company to 1470 shares of 1000 gulden (about £83 6s. 8d.) each out of a total issued capital of 1500 shares. Since the last report, the Austrian Government has formally sanctioned the new statutes (Articles of Association) of the Austrian Company, which were necessary to give final legal effect to the separation of the gas and electric undertakings. The new arrangements for the management of the Austrian Company are working satisfactorily. The Board express their pleasure in reporting that the improvement in the position of the Austrian Company mentioned twelve months ago was fully maintained during the year ended March last; and that a dividend of 30 per cent. (representing upon this Company's holding about £36,750) will be declared and paid in the course of a few days. This dividend, when received, will form part of the profits of the year 1906-7.

INCANDESCENT GAS LIGHTING IN LONDON SCHOOLS.

The Alleged Waste of Mantles.

At the Meeting of the London County Council last Tuesday, Mr. Cobb again asked for information with reference to the constantly recurring item in the cash paper of gas repairs in the elementary schools of the Metropolis. He said he gathered from the amount which had been spent that 40,000 gas-mantles had been used in the last four months, calculating the cost at 4s. a dozen. If they bought these mantles by the gross, they got them for 20s., which made the number put out of action during the last four months getting on for 80,000 mantles. In addition, they voted in the previous week £1620 for fitting up 16 schools for incandescent gas lighting. This meant spending £100 per school in changing the gas-lighting arrangements from the old to the incandescent system. He also found that they were going to discuss at the meeting of the Education Committee next day the allocation of a similar sum for another set of schools. Mr. T. Gautrey, on behalf of the Committee, said this subject had been brought before them, and, as he had anticipated, the mantles had not been used in the last three months. Before the evening school session had commenced, it was necessary to make preparations to meet the gas lighting required in the schools. A quantity of mantles were laid in stock, stored in the depôts of the Clerk of the Works, and distributed to the schools as needed. He had no doubt a large proportion of the 40,000 mantles referred to were in stock at the present time; and it was probable that the amounts mentioned were accounts for work done prior to Christmas. The payment out of the education accounts of sums amounting to £49,287 was approved.

METROPOLITAN WATER BOARD.

The Abandonment of the Lea Valley Works.

The first Meeting of the Board after the Easter recess was held on Friday—Sir R. M. BEACHCROFT in the chair.

The Works and Stores Committee reported that they had had before them the resolution passed by the Board on the 23rd of March last, in which the Board withdrew for the present session such parts of the Metropolitan Water Board (Lea Valley) Bill as related to the scheme for the construction of intercepting sewers, sewage disposal works, and a new water intake at Feilde's Weir. It appeared to the Committee of great importance that a clear indication should without delay be made of the Board's policy in the matter; and they had arrived at the conclusion that in passing the resolution it was not the intention of the Board to revive the proposal. They recommended that the Board should confirm the conclusion expressed by the Committee with reference to the resolution of the Board in March. A long discussion took place on the recommendation; and eventually the conclusion arrived at by the Committee as expressed in their report by the words "that in passing the resolution it was not the intention of the Board to revive the proposal," was confirmed by 29 votes to 19.

The Law and Parliamentary Committee reported that they had received a letter from the Local Government Board stating that the Department had received a communication from the Lea Conservancy Board, expressing alarm at the position of affairs, in view of the probability that the scheme referred to in the preceding paragraph would be allowed to drop. The Local Government Board asked for reasons for the abandonment of this part of the Water Board's Bill, and whether it was intended to proceed with the proposal next session. In a reply which the Committee had instructed the Clerk to send to the Local Government Board, it was pointed out that the scheme involved large capital expenditure, and it was anticipated that the Local Authorities concerned in the Lea Valley would have concurred in the scheme

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 429.

Issue.	Share.	When ex. Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
590,000	10	Apl. 11	10½	Alliance & Dublin 10 p.c.	21—22	..	4 15 5
160,000	10	,,	7½	Do. 7 p.c.	14½—15½	..	4 16 9
200,000	5	May 11	7	Bombay, Ltd.	6½—7*	..	5 0 0
40,000	5	,,	7	Do. New, £4 paid	4¾—5¼*	+¼	5 6 8
50,000	10	Mch. 9	14	Bourne-mouth Gas and Water 10 p.c. B 7 p.c. Pref. 6 p.c.	28½—29½	..	4 14 11
51,810	10	,,	7		16½—17½	..	4 0 0
53,200	10	,,	6		15—16	..	3 15 0
380,000	Stk.	Feb. 22	12½	Brentford Consolidated	263—268	..	4 13 3
300,000	,,	,,	9½	Do. New	200—205	+3	4 12 8
50,000	,,	,,	5	Do. 5 p.c. Pref.	123—128	..	3 16 11
206,250	,,	Dec. 14	4	Do. 4 p.c. Deb.	105—108	..	3 14 1
220,000	Stk.	Mch. 9	11½	Brighton & Hove Orig.	230—235	..	4 15 9
246,320	,,	,,	8½	Do. A. Ord. Stk.	165—170	+2	4 17 1
460,000	20	Apl. 11	10	British	42—43	..	4 13 0
100,000	Stk.	Feb. 22	6	Bromley, Ord. 5 p.c.	121—124	..	4 16 9
165,700	,,	,,	4½	Do. do. 3½ p.c.	92—95	..	4 14 9
500,000	10	May 11	7	Buenos Ayres (New) Ltd.	12—12½*	..	5 12 0
250,000	Stk.	Dec. 29	4	Do. 4 p.c. Deb.	97—99	..	4 0 10
150,000	20	Mch. 9	8½	Cagliari, Ltd.	23—25	..	6 12 0
100,000	10	Sept. 28	10	Cape Town & Dis., Ltd.	16¾—17½	..	5 15 11
100,000	10	Apl. 26	4½	Do. 4½ p.c Pref.	9¾—10¼	..	4 7 10
50,000	50	May 2	6	Do. 6 p.c. 1st Mort.	52—54	..	5 11 1
50,000	Stk.	Dec. 29	4½	Do. 4½ p.c. Deb. Stk.	100—102	..	4 8 3
1,443,280	Stk.	Feb. 22	5⅝	Commercial 4 p.c Stk.	113—115	..	4 10 5
560,000	,,	,,	5	Do. 3½ p.c. do.	110—112	..	4 9 3
475,000	,,	Dec. 14	3	Do. 3 p.c. Deb. Stk.	85—87	..	3 9 0
800,000	Stk.	,,	6½	Continental Union, Ltd.	129—132	..	4 18 6
200,000	,,	,,	7	Do. 7 p c Pref.	143—148	..	4 14 7
432,070	Stk.	Feb.	5½	Derby Con. Stk.	122—124	..	4 8 9
55,000	,,	Jan.	4	Do. Deb. Stk.	105—107	..	3 14 9
486,090	10	Jan. 25	11	European, Ltd.	23½—24½	..	4 9 9
354,060	10	,,	11	Do. £7 10s. paid	17½—18½	..	4 9 2
15,223,235	Stk.	Feb. 8	4⅛	Gaslight and Coke 4 p.c. Ord.	97—99	+1	4 8 11
2,600,000	,,	,,	3½	3½ p.c. max.	87—89	..	3 18 8
3,799,735	,,	,,	4	4 p.c. Con. Pref.	107—110	..	3 12 9
4,193,975	,,	Dec. 14	3	3 p.c. Con. Deb.	86—88	..	3 8 2
258,740	Stk.	Mch. 9	5	Hastings & St. L. 3½ p.c.	100—105	+2½	4 15 3
82,500	,,	,,	6½	Do. do. 5 p.c.	121—124	..	5 4 10
70,000	10	Apl. 11	11	Hongkong & China, Ltd.	19½—20½	..	5 7 4
4,940,000	Stk.	May 11	8	Imperial Continental	175—180*	..	4 8 11
473,600	Stk.	Feb. 8	3½	Do. 3½ p.c. Deb. Red.	96—98	..	3 11 5
175,242	Stk.	Mch. 28	6	Lea Bridge Ord. 5 p.c.	121—126	..	4 15 3
561,000	Stk.	Feb. 22	10	Liverpool United A	235—237	..	4 4 5
718,100	Stk.	Feb. 22	7	Liverpool United B	169—171	..	4 1 10
306,083	,,	Dec. 29	4	L'rpool Unit'd Deb. Stk.	109—111	..	3 12 1
75,000	5	Dec. 14	5	Malta & Medn., Ltd.	4¼—4⅝	..	5 5 3
560,000	100	Apl. 2	5	Met. of 5 p.c. Deb.	102—104	..	4 16 2
250,000	100	,,	4½	Melbourne 4½ p.c. Deb.	102—104	..	4 0 7
541,920	20	Nov. 15	3½	Monte Video, Ltd.	11⅛—12½	..	5 12 0
1,675,892	Stk.	Feb. 22	4½	Newc'tle & G'tesh'd Con.	108—110	..	4 4 1
406,025	Stk.	Dec. 29	3½	Do. 3½ p.c. Deb.	98—100	..	3 10 0
15,000	10	Mch. 9	10	North Middlesex 10 p.c.	19—20	..	5 0 0
52,940	10	,,	7	Do. 7 p.c.	14½—13½	..	5 3 8
300,000	Stk.	May 11	8	Oriental, Ltd.	147—150*	..	5 6 8
600,000	5	Mch. 28	7	Ottoman, Ltd.	0—6½	..	5 7 8
398,490	5	Apl. 26	7	Primitiva Ord.	6½—7	..	5 0 0
796,980	5	Jan. 25	5	Do. 5 p.c. Pref.	5⅛—5⅜	—⅛	4 13 0
488,900	100	Dec. 1	4	Do. 4 p.c. Deb.	98—100	..	4 0 0
851,070	10	Apl. 26	7	River Plate Ord.	12½—13	—¼	5 7 8
300,000	Stk.	Dec. 29	4	Do. 4 p.c. Deb.	98—100	..	4 0 0
250,000	10	Mch. 28	8	San Paulo, Ltd.	13¾—14⅛	—¼	5 12 3
70,000	50	Jan. 2	5	Do. 5 p.c. Deb.	50—52	..	4 16 2
135,000	Stk.	Mch. 28	10	Sheffield A	244—246	..	4 1 4
209,984	,,	,,	10	Do. B	243—245	..	4 1 8
523,498	,,	,,	10	Do. C	243—245	..	4 1 8
126,106	Stk.	Mch. 9	5½	Shrewsbury Ord. 5 p.c.	109—119	..	4 12 5
70,000	10	Sept. 28	10	South African	16½—17½	..	5 14 3
6,250,000	Stk.	Feb. 22	5½	South Met., 4 p.c. Ord.	125—127	..	4 6 8
1,895,445	,,	Jan. 11	3	Do. 3 p.c. Deb.	87—89	..	3 7 5
575,000	Stk.	Mch. 9	5½	S'th Suburb'n Ord. 5 p.c.	120—123	..	4 9 5
60,000	,,	,,	5	Do. 5 p.c. Pref.	125—130	..	3 16 11
112,533	,,	Jan. 11	5	Do. 5 p.c. Deb. Stk.	132—137	..	3 13 0
502,310	Stk.	May 11	5	Southampton Ord.	105—110*	—½	4 10 11
120,000	Stk.	Mch. 9	6¼	Tottenham and 4 p.c. B 3½ p.c.	124—127	..	4 18 5
363,020	,,	,,	4¾		99—102	..	4 13 2
137,500	,,	Dec. 14	4	Edmonton 4 p.c. Deb.	105—107	..	3 14 9
182,380	10	Dec. 29	8	Tuscan, Ltd.	10¼—10¾	..	7 8 10
149,900	10	Jan. 2	5	Do. 5 p.c. Deb. Red.	99—101	..	4 19 0
30,000	Stk.	Feb. 22	7½	Wandsworth A 5 p.c.	—	..	—
255,636	,,	,,	6½	B 3½ p.c.	133—136	..	4 11 11
75,000	,,	,,	5½	C 3½ p.c.	110—113	..	4 16 0
69,416	,,	Dec. 29	3	Putney 3 p.c. Deb. Stk.	82—85	..	3 10 7
745,872	,,	Mch. 9	5⅜	West Ham 5 p.c. Ord.	107—109	..	4 14 0
185,000	,,	,,	5	Do. 5 p.c. Pref.	122—125	..	4 0 0
193,300	,,	Dec. 29	4	Do. 4 p.c. Deb. Stk.	106—109	..	3 13 5

Prices marked * are "Ex div."

without placing onerous conditions on the Board. This anticipation was not fulfilled; and when the Committee came to investigate the numerous petitions against the Bill, and the demands made by the War Department in respect of their works at Waltham Abbey, they found that the evidence available was insufficient to justify proceeding with the scheme, hampered as it would be with grave restrictions and obligations seriously prejudicial to the interests of the Board. On the question whether it was the intention to proceed with the proposal next session, it was not possible for the Committee to give a reply at present. But a report on the subject was about to be submitted to the Board by the Works Committee; and a further communication would be sent to the Local Government Board in due course. In the meantime, there was little cause for anxiety with respect to the supply of water derived from the Lea; for, as would be seen from the last reports of the Official Water Examiner, the Lea filtered water was "pure and of good quality, and the East London district supply, consisting mainly of filtered Lea water, contains less organic impurity than any of the Thames-derived supplies." This was amply confirmed by the Director of the Water Board's laboratory (Dr. A. C. Houston), who reported that during April 38 samples of filtered Lea water were examined bacteriologically, and none of them contained any *bacillus coli*, even when 100 cubic centimetres of the water were subjected to culture tests. Dr. Houston further stated that the water during the period in question had been "of great bacteriological purity." The report was received.

A return was presented by the Works and Stores Committee, giving information relating to the supply of water in the month of March. It showed that the total average daily supply was 203,288,000 gallons, while the number of houses supplied was 1,043,293; the total estimated population being 6,791,017. The mean supply per head per day was 29·9 gallons; the figure for the corresponding month of 1905 being 30·3 gallons. The quantity of water in store in impounding reservoirs at the end of the month was 7128 million gallons. There were connected 1829 additional supplies (including those required for trade purposes); and 6630 yards of mains were laid.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

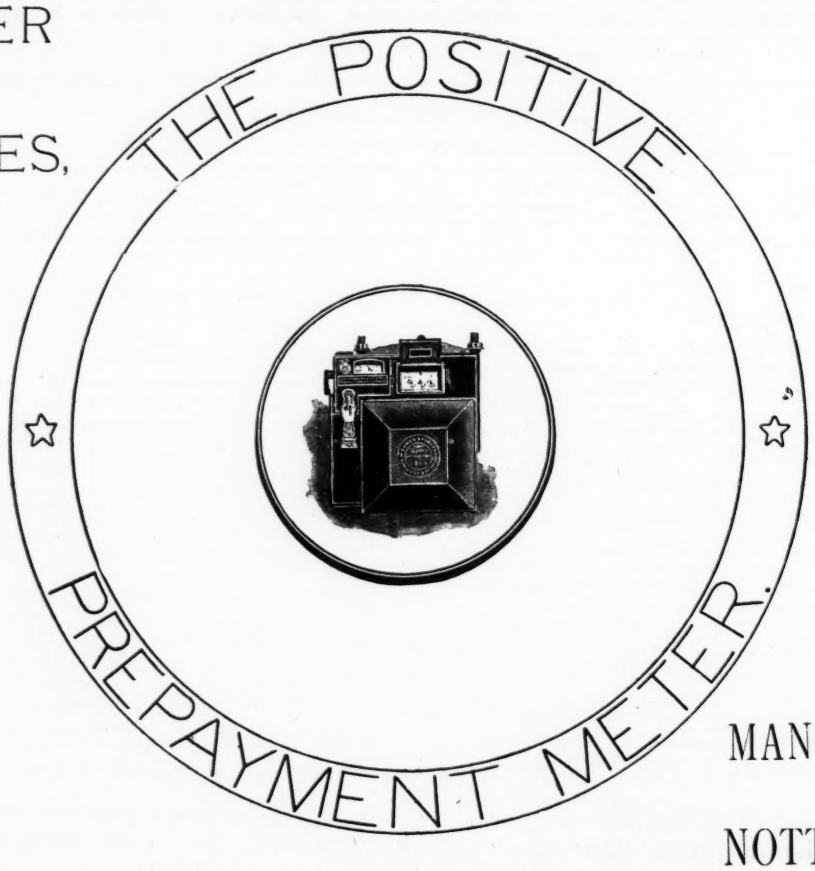
Upon the matter of the gas-works, the Corporation of Falkirk, after years of what appeared to be needless procrastination, have at last come to see eye to eye. At the opening ceremony of the new works on Wednesday [a report of which appears on p. 443] there was not a dissentient voice, but rather everyone was louder than his neighbour in commendation of what had been accomplished. So long as the works existed only in imagination, there were some who halted, apparently in the expectation that something less costly might be found which would serve the purposes of the community; but now that the works are erected and equipped, there is a general acceptation of the situation that a very creditable piece of work has been done. A novelty in the works is the extensive use of electricity for the driving of machinery; the current being taken from the Corporation Electricity Department. The proceedings at the opening passed off very satisfactorily, though Mr. W. M'Crae, the Engineer and Manager, was not there owing to illness. His regretted absence was matter of much sympathizing comment; and the sentiment was universally cherished that he may soon be able to return to the scene of his labours, and reap the well-merited reward of peace, happiness, and prosperity attending the gas enterprise of the Corporation.

There was to-day a short conversation in the Court of Session upon the procedure to be adopted in the working out of the litigation between Messrs. James Muir and Son, Limited, and the Edinburgh and Leith Gas Commissioners. Matters were not much advanced, however; and it would scarcely be necessary to mention here that the case was called, unless to explain that the reason for the lack of progress was that Lord Stormonth-Darling has not yet returned from holiday. The case was heard before three Judges, of whom he was one; and, in his absence, the Bench before which the case is pending did not muster a quorum. The only information elicited to-day was the fact that the sinking of the new well within the grounds of the gas-works is making satisfactory progress, and that, so far, no traces of polluting material have been found.

The Gas Committee of the Glasgow Corporation on Thursday recommended that, among other increases of salary, Messrs. A. Smith, the Station Manager at Tradeston; Mr. A. M. Macleod, the Station Manager at Dawsholm, and Mr. J. Webster, the Station Manager at Provan, should each receive an advance in their salaries of £50 a year. It was moved, as an amendment, that the advance should be £25 in each case; but the Council, by a show of hands, adopted the recommendation of the Committee.

Following the result of the plebiscite of ratepayers of Hamilton upon the question of the construction of a railway siding into the gas-works, the subject was before the Town Council on Tuesday of this week. Mr. Cassells moved that, in terms of the result of the plebiscite, the Council resolve to proceed no further in the matter. An amendment was moved to the effect that they do not proceed "in the meantime." The motion was carried by eight votes to seven; but it was pointed out that all that was decided by the motion was that nothing be done in the meantime, as the Council have no power to bind their successors, and that the subject may be again brought forward in November. This shows that the cost and trouble of taking the plebiscite may be altogether energy wasted. Having considered the coal tenders, the Committee recommended the purchase of 6000 tons of Cadzow cannel, 2500 tons of Bent cannel, 3500 tons of Cadzow splint, 2500 tons of Bent splint, and 1500 tons of Shellyton Virtuewell. The question was asked in the Council why the last-named coal was recommended, seeing there was a difference in the price. Bailie Hamilton,

SAWER AND PURVES,



MANCHESTER AND NOTTINGHAM.

the Convener, explained that the difference in price was 8s. 11d. to 8s. 6d., but that a greater volume of gas was obtained from the one as compared with the other. The recommendations of the Committee were adopted.

The action for interdict against the Bothwell and Uddingston Gas Company was discussed before Sheriff-Substitute Thomson in the Sheriff Court at Hamilton on Monday. It was stated that the pursuer's meter had been certified to be correct, and, on behalf of the Gas Company, it was contended that this was sufficient for the disposal of the case. The pursuer—Mr. J. Turner—maintained, on the other hand, that he was entitled to proof upon the question of whether the Company had supplied gas at a greater pressure than was warranted. Judgment was reserved.

The Gas Department of the Glasgow Corporation have notified that gas cooking-stoves and range-fittings, fixed and connected free of charge, can now be hired at the reduced figure of 2s. 6d. and upwards per annum.

A Parliamentary Commission, presided over by the Duke of Argyll, have this week held an inquiry in Glasgow into an application by the Corporation of Dumbarton for powers to bring in an augmentation to the burgh water supply, and the extension of the burgh boundaries. The present water supply, it was stated, was obtained in 1883, and it had now, on account of the extension of the town, become totally inadequate. The supply was a million gallons per day, and the consumption sometimes amounted to 1¼ millions. The proposal was to take a supply of water from Loch Sloy, to the east of the head of Loch Lomond, 27 miles from Dumbarton. The burgh boundaries were to be extended so as to take in land extending to 330 acres, which, although not yet feued, was suitable for feuing purposes. There was strong opposition to the scheme by the County Council, and by local landlords. The Commission found the preamble not proved.

We have received from Mr. James T. R. Wilson, the Convener of the Cleaning and Lighting Committee of the Edinburgh Corporation, the following letter (dated the 11th inst.) on the subject of the public lighting in Edinburgh :—

Owing to my absence from town, your issue of the 17th of April only came under my notice to-day. Your "Own Correspondent," referring to the scheme for the conversion of the flat-flame into 2½ cubic feet inverted incandescent gas-lamps, says : "The Convener expressed his indebtedness in the matter to Mr. Newington, the Electrical Engineer, and to Mr. Herring, the Gas Engineer. No mention was made of the Inspector of Lighting, *who does not seem to have had much share in the formulating of the proposal.*"*

Even a complete ignorance of local affairs cannot excuse the gratuitous assumption of the last sentence. It is true that I acknowledged the courtesy received from officials *outside* the Lighting Department, especially from Mr. Herring, who was ever ready, either on his own initiative or at my request, to make photometric tests and to furnish the results. (These are summarized in your issue of the 24th ult.) But, surely, it would have been superfluous for me to specially mention the Inspector of Lighting (Mr. Mackay), since he was, from his position, obviously the official mainly instrumental in carrying out the practical trials of these lamps in the streets, on the results of which the Committee's recommendation was based.

As your correspondent has, however, cast a reflection upon a most painstaking public official, I feel bound to make it perfectly clear that, so far as the practical lighting of our streets is concerned, Mr. Mackay was the pioneer, and has been the keenest advocate throughout, of the inverted burner. No one can know better than I the amount of thought and care he has given, and is still giving, in overcoming the difficulties, and in producing a satisfactory combination of lantern, burner, and lighter. I trust that, in fairness, you may give publicity to this appreciation of the services of Mr. Mackay in the introduction of a scheme which is unique in the history of street lighting.

Your correspondent also refers to our action as homologating Mr. Simmance's report. This is not the case, as the report made no mention of inverted burners. Our recommendation may be said to be the result of a common-sense consideration of the lighting results and costs of the various systems. Mr. Simmance went beyond the scope of his instructions to comment upon the condition and maintenance of the incandescent lamps in Edinburgh—making statements generally considered as, at least, exaggerated. At the present time, without any increase in the staff having taken place since the date of the report, I consider the condition of the public incandescent lamps to be, on the whole, equal to any in the United Kingdom. In the course of a few months, with the increase of staff now sanctioned, I hope and believe that the street lighting of Edinburgh will, for modernity and efficient supervision, be an example to any city in the world.

* The italics are the writer's.—ED. J.G.L.

CURRENT SALES OF GAS PRODUCTS.

Week ending May 12.

There is not much of interest to report in London tar products. Inquiries for pitch for forward shipment continue to be received; while makers maintain their firm attitude with regard to price. Crude carbolic acid is still in large demand; but makers here have little for sale. 90 per cent. benzol remains at about 9¾d. net, notwithstanding the desire to lower its value. Toluol and solvents have buyers, but no sellers. Creosote salts are also in demand; but present low prices do not encourage makers to produce them. Ordinary London creosote oil is very firm, and fully 2d. net per gallon in bulk would have to be paid for the best qualities. Sulphate of ammonia is without change.

CARBURETTED WATER-GAS APPARATUS

Merrifield—Westcott—Pearson Patents.

The Economical Gas Apparatus Construction Co., Ld.

W. H. PEARSON, Chairman.
W. H. PEARSON, Junr., Deputy-Chairman.
J. T. WESTCOTT, Manager.
L. L. MERRIFIELD, M.Inst.M.E., Engineer.

London Offices: 19, ABINGDON STREET, WESTMINSTER, S.W.
American Offices: TORONTO. TELEGRAPHIC ADDRESS: "CARBURETED, LONDON."

CARBURETTED WATER-GAS ENGINEERS.

The above Company have erected since 1893, or are now erecting, their Universal Type of Carburetted Water-Gas Plant at the following Gas-Works:—

	Cub. Ft. Daily.		Cub. Ft. Daily.		Cub. Ft. Daily.
Blackburn	1,250,000	Buffalo, N.Y.	2,000,000	Newcastle-on-Tyne	1,800,000
Windsor St. Works, Birmingham	2,000,000	Winnipeg, Man.	500,000	Leeds	1,800,000
Saltley Works, Birmingham	2,000,000	Colchester (Second Contract)	300,000	Malton	150,000
Colchester	300,000	York	750,000	Smethwick	500,000
Birkenhead	2,250,000	Rochester	500,000	Gravesend	300,000
Swindon (New Swindon Gas Co.)	120,000	Kingston, Ont.	300,000	Pernambuco, Brazil	125,000
Saltley, Birmingham (Second Contract)	2,000,000	Crystal Palace District	2,000,000	Duluth, (Second Contract)	300,000
Windsor St., Birmingham (Second Contract)	2,000,000	Duluth, Minn.	300,000	Leicester (Second Contract)	1,000,000
Halifax	1,000,000	Caterham	150,000	Newport (Second Conttract)	250,000
Toronto	250,000	Leicester	2,000,000	Brockville	250,000
Ottawa	250,000	Enschede, Holland	150,000	Toronto (Third Contract)	750,000
Lindsay (Remodelled)	125,000	Buenos Ayres (River Plate Co.)	700,000	Montreal, Ont. (Second Con.)	1,800,000
Montreal	500,000	Burnley	1,500,000	Toronto (Fourth Contract)	1,000,000
Toronto (2nd Cont., Remodelled)	2,000,000	Kingston-on-Thames	1,750,000	Hamilton, Ont.	400,000
Belleville	250,000	Accrington	500,000	Rochester (Third Contract)	1,600,000
Ottawa (Second Contract)	250,000	Tonbridge	300,000	Leeds (Second Contract)	900,000
Brantford (Remodelled)	200,000	Stretford	500,000	Buenos Ayres (Primitiva Co.)	1,200,000
St. Catherines (Remodelled)	250,000	Oldbury	300,000	Buenos Ayres (New Co.)	1,200,000
Kingston, Pa.	125,000	Todmorden	500,000	Christchurch, N.Z.	300,000
Peterborough, Ont.	250,000	Saltley, Birmingham (Third Contract)	2,000,000	Rochdale	1,600,000
Wilkesbarre, Pa.	750,000	York (Second Contract)	750,000	St. John's, Newfoundland	250,000
St. Catherines (Second Cont.)	250,000	Rochester (Second Contract)	500,000	Brantford (Second Contract)	400,000
		Newport (Mon.)	250,000	Smethwick (Second Contract)	500,000
		Tokio, Japan	1,000,000	Pontypridd	250,000
				Montreal (Third Contract)	1,800,000

And, in addition, COAL GAS PLANTS at NELSON, B.C., CHATHAM, BERLIN, NAPANEE, OWEN SOUND, CALGARY, and WINNIPEG.

Sulphate of Ammonia. LIVERPOOL, *May* 12.

There has again been a quiet market, and prices are slightly easier, the closing quotations being £12 2s. 6d. per ton f.o.b. Hull, and £12 5s. per ton f.o.b. Liverpool and Leith. A speculative effort is being made to further depress values, and it remains to be seen how far it will be successful. Meantime, it may be noted that April shipments show a substantial increase upon those for April, 1905, that home demand has been good, and that at no point is there any accumulation of stock in the hands of makers to weigh down the market. The forward position is in speculative hands so far as actual business is concerned, for although some of the smaller makers would accept prompt prices, the large makers have not come to that, and are not showing any great anxiety to operate. Down to the equivalent of £12 per ton f.o.b. is reported to have been accepted speculatively.

Nitrate of Soda.

This article is quiet but steady at 11s. 7½d. and 11s. 10½d. per cwt. for ordinary and refined qualities respectively, and stocks here are very low.

Tar Products. LONDON, *May* 12.

Business has been generally quiet during the past week, and considerable uncertainty prevails as to future supplies in more than one important product. No change of importance appears to have taken place in pitch. Manufacturers are evidently more anxious to sell for prompt than for forward delivery. As regards London, the position remains unaltered; but there is no doubt dealers would sell at 27s. 6d. for prompt, though for forward it is reported that a considerably higher price has been declined. The largest London makers remain in the same position, and appear fairly indifferent as to the market for forward delivery; preferring to wait until the position in the Pas de Calais district is more clearly defined. In Lancashire, manufacturers still maintain relatively high prices for prompt, and do not appear anxious to sell forward. Benzol has again been done by London refiners at 9¾d. for May-June; while offers of 10¼d. were declined for 50 to 90 per cent. by refiners in the North. There is absolutely nothing doing in anthracene, and the position does not seem likely to alter for some time to come. In toluol, there is practically nothing offering. Buyers are prepared to pay 1s. 0½d. to 1s. 0¾d. for early delivery; but manufacturers have none to spare, and will only sell as produced. Solvent continues very firm for prompt delivery, and the market is strong for home consumption; 1s. 1½d. to 1s. 2d. having been freely paid for May delivery, though business is reported at under 1s. in the North for July-December. The demand for crude carbolic has been very strong indeed during the past week, and there has been quite a revival in this article. 1s. 10½d. is reported to have been paid for May-June delivery; while there is an inquiry now in the market for the first six months of next year. Makers are not inclined to sell at under 1s. 10½d. to 2s. for prompt, while for next year they do not care to quote just at present. As regards crystals, this market has not improved in proportion to crude. English makers are still sellers of 39 to 40 per cent. at 6d., but cannot obtain this price, as it is believed that German makers would accept slightly lower figures. In creosote, the demand continues very good indeed as regards London, where prices are well maintained; but there is rather more offering in the Lancashire district. It is difficult to fix the value of Yorkshire oil, as reports received from manufacturers as to prices realized differ widely, and range from 1½d. to 1¾d., according to situation and point of delivery.

The average values during the week were: Tar, 16s. to 21s. Pitch, London, 27s. to 27s. 6d.; east coast, 26s. 3d. to 26s. 6d.; west coast, 25s. Benzol, 90 per cent., 9¾d.; 50 to 90 per cent., 10d. to 10½d. Toluol, 1s. 0½d. to 1s. 1d. Crude naphtha, 4d.; solvent naphtha, 1s. 0½d. to 1s. 1½d.; heavy naphtha, 11d. to 11½d. Creosote, London, 1⅞d. to 1⅝d. Heavy oils, 2¼d. Carbolic acid, 60 per cent., 1s. 10d. to 1s. 10½d. Naphthalene, £4 10s. to £8 10s.; salts, 19s. to 20s. Anthracene, "A" quality, 1½d. to 1⅝d.; "B" quality, unsaleable.

Sulphate of Ammonia.

The market remains in a very quiet state. The largest gas companies still maintain their nominal quotations; but it is reported that business has been done on Beckton terms at £12, though most dealers ask £12 2s. 6d., which may be taken as about the price. In Leith, the price remains unchanged at £12 5s. In Hull, business is reported at £12 2s. 6d. for prompt delivery of a fine make; while in Liverpool, sales are reported at £12 2s. 6d. to £12 3s. 9d., according to position and quality.

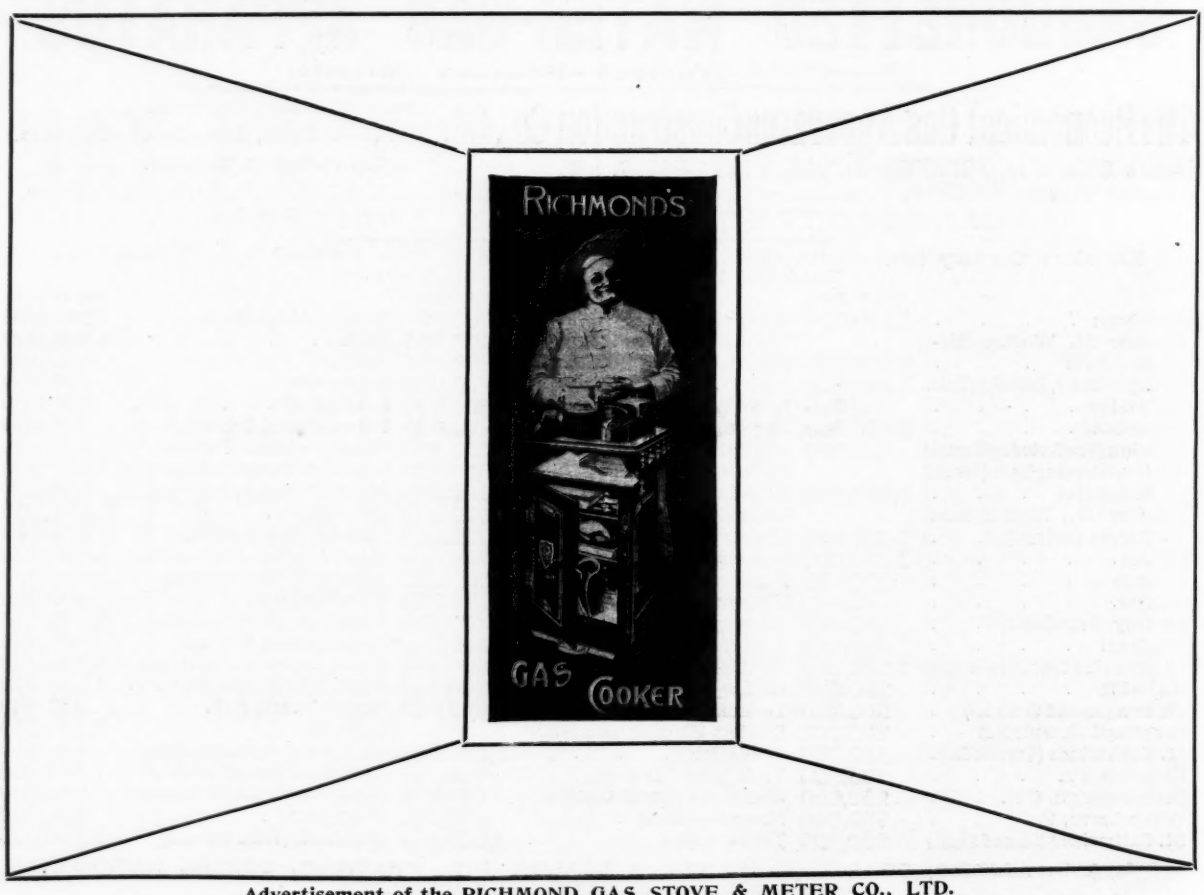
COAL TRADE REPORTS.

Lancashire Coal Trade.

We have not had much springlike weather so far, with the result that the demand for house fuel shows little falling off, and a good trade is being done. Steam and engine coal continues to meet with a strong inquiry. Gas coal and cannel, apart from the recent Manchester and Salford Corporations' contracts, meet with small inquiry. Coal for shipping is satisfactory, and trade generally is steady. All isolated colliery disputes between employers and men appear to be at an end in this part of the country; and the hope of the latter is now centred on the approaching meeting by the Coal Conciliation Board to consider the application by the operative colliers for an increase of 5 per cent. in wages. Quotations at the pits are as follow: Best house coal 13s. to 14s., secondary 12s. to 13s., common 9s. to 10s., steam and forge 8s. to 9s., best engine fuel 7s. 11d. to 8s. 9d., best slack 6s. 9d. to 7s. 9d., medium 6s. 6d. to 7s. 6d., common 5s. 6d. to 6s. 6d. Coal for shipping on the Manchester Canal is 9s. 6d. to 10s. 6d.

Northern Coal Trade.

The coal trade shows some quietness; the abnormal demand from France having ceased, while there is the falling off in the consumption



Advertisement of the RICHMOND GAS STOVE & METER CO., LTD.
London Offices and Show-Rooms: 132, Queen Victoria Street, E.C. General Offices and Works: Warrington, &c.

of fuel that usually occurs at this season. On the other hand, there is a fuller export, more especially of steam coals, the Baltic season having now begun in earnest. Best Northumbrian steams are quieter, and the price is a little lower at 11s. per ton f.o.b. Second-class steams are about 10s. 6d., and steam smalls are rather less scarce at about 7s. to 7s. 6d. In the gas coal trade, the collieries are working fairly well; but the home demand is less than it was, and is not so pressing, though there is a heavier shipment from some of the collieries that have contracted for exports to the Baltic. Durham gas coals vary according to quality from about 9s. 3d. to 10s. 3d. per ton f.o.b. There have been additional contracts placed for the great southern companies; and there are also some northern towns in the market for gas coals. Substantially, the renewal is in each case at an advance that varies, but may perhaps average 9d. per ton. Other contracts are yet to be defined. The coke trade is now active; and gas coke—being in limited output—sells fairly, though the price varies a little. On Tyneside, from 10s. 6d. to 10s. 9d. per ton f.o.b. is a current quotation for good gas coke.

Scotch Coal Trade.

The market remains unchanged. There is a satisfactory demand, which is taking up all the output; but prices do not seem to respond to the briskness of trade. The anticipation is growing that during the summer current prices will be found to be higher than forward rates; but labour troubles may produce changes which are as yet unforeseen. The prices quoted are: Main 7s. 9d. to 8s. per ton f.o.b. Glasgow, ell 8s. 9d. to 10s. 3d., and splint 9s. 6d. to 9s. 9d. The shipments for the week amounted to 292,619 tons—a decrease of 29,219 tons upon the previous week, but an increase of 37,807 tons upon the same week of last year. For the year to date, the total shipments have been 4,373,104 tons—an increase of 451,414 tons upon the corresponding period of 1905.

Responsibility for Damage to a Lamp.—Last week, at Eccles, a carter employed by an Old Trafford contractor was ordered to pay £2 15s. and costs for breaking a lamp. The Corporation alleged the lamp was broken by projecting timber on the lorry of which the man had charge; but the defendant contended that it was done by the cross-bar of the chain horse, which had shied at a tramcar. The Bench agreed to state a case.

Poisoning by Gas in Glasgow.—On the morning of Tuesday of last week, a girl named Christian Scott, 13 years of age, was suffocated by gas in her mother's house at Hope Street, Glasgow. Mrs. Scott went to reside there on the previous Friday. There was a smell of gas in the attics; and on Monday a plumber was sent to repair the defect. It is said that he informed the tenant that the attic could be used with safety, and two children slept in it that night. In the morning, they were both found to be unconscious; and the girl died on being taken to the Royal Infirmary. Death was due to gas poisoning.

Opening of Streets by Public Companies.

The Metropolitan Paving Committee have received a reply from the Local Government Board to their request that the Prime Minister and the President of the Local Government Board should receive a deputation from representatives of the Metropolitan Borough Councils on the subject of the inconvenience caused by the opening of streets by public companies and others having statutory rights to do so. The Local Government Board's communication is to the effect that the Government are not yet in a position to express an opinion on the findings of the Royal Commission on London Traffic, and that as no legislation could be anticipated this session on the subject, the President of the Local Government Board does not think it necessary to trouble the deputation to attend at the present time. The Committee are to ask the President to receive a deputation in the autumn, in order that the views of the Borough Councils may be impressed on the Government before the details of the Government Bill are settled.

Motor Omnibuses and Gas-Lamps.

At the Meeting of the Wandsworth Borough Council on Wednesday, the Highways Committee reported having considered a letter from the Wandsworth and Putney Gas Company stating that, owing to the increased number of cases of damage to lamps by motor omnibuses and other motor vehicles, the Company must in future decline to seek to recover the cost of repairs from the parties causing the damage. The Company forwarded an account for £38 12s. 1d. for repairing lamps damaged by various vehicles, including £4 1s. 3d., the balance of an amount for which the Gas Company sued the London Road Car Company, when judgment was given in favour of the defendants, with costs, owing to the alleged greasy condition of the roads. The Company suggested that the Council should give an open order to repair the lamps at the Council's cost immediately after the damage had been done; and they offered to obtain for the Council's use all possible information as to the vehicles causing the damage. The Committee recommended that the Company should be informed that the Council regretted their inability to undertake any responsibility in the cases set out in the account, but that should any of the amounts be paid to the Council they would be handed over to the Company. They added that the suggestion as to a general order for reinstatement could not be adopted; and a separate order would be given by the Surveyor in each case. The recommendation was agreed to.

The Bridlington Gas Company recently instructed the Richmond Gas Stove and Meter Company, Limited, to hold an exhibition of gas appliances and thoroughly canvass their district for stoves. Upwards of 350 gas cooking-stoves have been added to the number out on hire as a result of this development; making a total of about 1500 cookers now in use.

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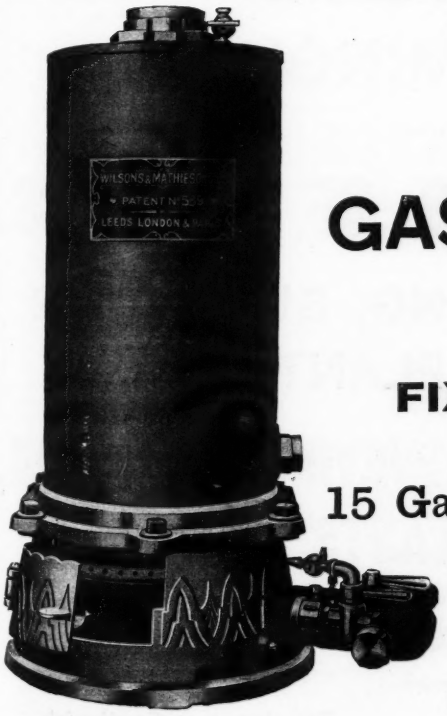

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Sales of Stocks and Shares.

At the Mart, Tokenhouse Yard, E.C., last Tuesday, Mr. Alfred Richards conducted a large sale of stocks and shares of Gas and Water Companies, including two issues of new capital by order of Directors. The first lots consisted of 400 additional ordinary £10 shares in the Lowestoft Water and Gas Company, ranking for a maximum dividend of 7 per cent., but carrying one at the rate of 5¼ per cent. as from the date of payment. They were all sold at from £11 to £11 2s. 6d. per share. A parcel (£1000) of 4 per cent. perpetual debenture stock of the same Company was disposed of at from £104 5s. to £105 17s. 6d. per £100 of stock. By order of executors and another owner, some original and ordinary stock of the Felixstowe Gas Company was next offered. The former, ranking for 10 per cent. dividend but carrying 8 per cent., fetched £160 per £100; and the latter, with a standard of 7 per cent. but carrying £5 12s. per cent., £112 5s. to £113 per £100. A small parcel of consolidated ordinary 5 per cent. stock of the Enfield Gas Company, carrying 5¼ per cent. dividend, was sold at £113 5s. to £113 15s. per £100. Two parcels of stock of the Brighton and Hove General Gas Company were next submitted. The first consisted of £625 of original ordinary 10 per cent. consolidated stock, the last dividend on which was at the rate of 11¼ per cent. per annum; and it was disposed of at £234 15s. per £100 *cum div.* The second was a parcel of £1260 of "A" ordinary consolidated 7 per cent. stock, carrying 8¼ per cent. dividend; and it fetched £170 per £100. Next came new issues of £3000 of 5 per cent. ordinary stock and £1000 of 4 per cent. perpetual debenture stock of the Chigwell, Loughton, and Woodford Gas Company. The former was all sold at from £102 to £103 15s., and the latter at £102, per £100; the purchasers taking dividend and interest as from the 1st of July. The succeeding lots consisted of small parcels of £10 shares in the Harrow and Stanmore Gas Company, offered for sale by order of Executors. Fully-paid "A" original shares, carrying 9¾ per cent. dividend, fetched £19 10s. each; "B" shares, carrying 7 per cent. dividend, £15 5s. each; and "C" shares, carrying £6 16s. 6d. per cent., £16 apiece. Six £25 additional shares (7 per cent.) in the Chelmsford Gas Company, on which the last dividend paid was at the rate of £6 6s. per cent. per annum, free of income-tax, fetched £33 each. The final lots consisted of £300 of new ordinary 5 per cent. stock of the Southend Gas Company, carrying 5¾ per cent. dividend; and it was all sold at £119 15s. On the same day, Mr. C. A. Joel sold, in Newcastle, £50,000 of 5 per cent. preference stock of the Newcastle and Gateshead Water Company at an average price of £145 1s. 1d. per £100 of stock; the price on the market being £147. On Wednesday, Mr. J. C. M. Turner sold at Ashton 86 perpetual £1 annuities issued by the Dukinfield Local Board of Health by virtue of the Dukinfield and Denton Local Boards (Gas) Act, 1877, and now payable by the Corporation of Dukinfield, for £28 2s. 6d. each; 86 similar annuities, payable by the Denton Urban District Council, fetching £28 each. Some £30 shares in the Ashton Gas Company were sold at £93 10s. and £92 10s. apiece. At the Mart, on the same day, Mr. Frank Amos offered £219 of "A" and "B" consolidated stock of the Canterbury Gas and Water Company, in 22 lots, the whole of which were sold at the rate of £20 5s. per £10 share. Mr. F. J. Godden, on the same occasion, put up for sale, by order of executors, £96 of "A" stock, £200 of consolidated "B" stock, and £60 of new "A" stock in the same Company. It was quickly purchased at the rates of £20 and £20 5s. per £10 of stock.

A Corporation Sued for Negligence.

At the Congleton County Court, some days ago, his Honour Judge Brown, K.C., heard a case in which Harriet Higgins sued the Corporation of Congleton for £50 for personal injuries sustained by her through the alleged negligence of the Corporation or their servants. On the night of Sept. 6, the plaintiff went to see Mrs. Campbell, a neighbour, who was ill. A street-lamp close to the house was then burning; but when she was leaving about 11.10 p.m., she noticed that the light had been extinguished, and that it was very dark. From Mrs. Campbell's house to the footpath, there were several steps; and the footpath was also raised about 2 feet from the roadway—there being steps from the footpath into the road. Mr. Campbell put a light near the door in order that she could see to get down the house steps; but owing to the street-lamp being out, she could not see the second lot of steps into the roadway, and fell down, breaking her leg. Plaintiff admitted that she was quite familiar with the steps; but it was contended on her behalf that the lighting must be reasonable, and that it was wrong to turn out the lamp at such a dangerous place as the one where the accident happened. The Gas Manager (Mr. James Smith) stated that during September the lamps were extinguished at 11 o'clock at night; and it would take the lamp lighter nearly an hour to complete the round, which included Burslam Street (where the plaintiff broke her leg); the latter place being nearly at the end of the round. The nearest lamp to the spot where Mrs. Higgins fell was 47 feet away, and the next one 122 feet. In giving judgment, his Honour held that there had been no contributory negligence on the part of the plaintiff. It appeared that the road had been in the same condition for many years, and was not fenced; but he came to the conclusion that it was not a nuisance in the sense of being a dangerous place maintained by the Corporation, for there was no evidence that it had been brought to the knowledge of the Corporation that it was dangerous. The accident might have happened at any time. It was impossible to say, as a matter of law or fact, that the Corporation were bound to fence and rail all such places as these; it being left to the discretion of the Corporation. He held, therefore, that an action could not succeed against them for not railing the place off; and the question of lighting was also a matter in their discretion. They all sympathized with the plaintiff because of the accident; but she had no legal claim on the defendants, for whom judgment must be given. In case of appeal, his Honour assessed the damages at £20.

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Gas to Supersede Oil at Petworth.—The inhabitants of Petworth, who have long suffered the inconvenience of having oil-lamps in the streets, have decided to go in for public gas-lamps. In this way they will adopt the best means for avoiding the "mishaps" on winter nights to which it is stated they have hitherto been accustomed.

Labour Troubles on the Continent.—In the "JOURNAL" last week, reference was made to a strike of gas workers at Toulon, the effect of which was to plunge the town in darkness. It appears that though the men have returned to work, matters have not greatly improved; for, owing to the injury done to the mains, there is great waste of gas. A report has reached England from Brussels that for weeks the workpeople of Verviers, a small but very industrious town of Belgium, have been on strike. A few nights ago, the lamplighters were assembled as usual ready for duty, when they agreed to send a deputation to the Gas Company asking for a small increase of salary, which was refused. Accordingly they at once struck work. As it was difficult to get the lamps lighted by substitutes, the Company decided to keep them burning night and day.

Water-Works Extensions for Middlewich.—A Local Government Board inquiry was held by Mr. Sandford Fawcett at Middlewich last Thursday, regarding an application of the Urban District Council for authority to borrow £14,800 for purposes of water supply and reservoir construction in connection with the springs on the Crown lands at Delamere. To expedite the carrying out of the scheme submitted to the Council, Sir John Brunner, M.P., bought the necessary land; a stipulation being made that it should be used for no purpose other than that of a water supply. The land has been conveyed direct to the Council. Twelve miles of water-mains will be necessary to connect the supply with Middlewich. A reservoir holding 680,000 gallons will be built; and there will be fixed two pumps capable of delivering 200,000 gallons a day. There is an unlimited supply at the springs; and Dr. Carter Bell, the County Analyst, certified that it was of exceptional quality and purity. The borrowing powers of the town are £19,843, and the present scheme will bring the indebtedness to £19,237. The application was for a loan repayable in 60 years.

Municipal Trading and the Rates.—Alderman Wade, the Chairman of the Bradford Finance Committee, when introducing his budget to the Council, gave expression to his views on the system of relieving the rates by means of profits realized on municipal trading enterprises. He said that in many towns large sums were year by year appropriated to the relief of rates from trading concerns of corporations. As much as £29,000 had been appropriated to the relief of rates in Bradford from gas profits in one year, representing at that time 8½d. in the pound. "I am not," he continued, "for a moment advocating the principle of indirect taxation, but merely pointing out that if the same practice was carried out to-day as was in force years ago, when profits were apparently made for the express object of relieving rates, the burden of the rates would appear comparatively much lighter. But in reality the relief is misleading. Sell your goods certainly at not a penny less than they cost; but be sure what they do cost before you fix the selling price. Make due provision for contingencies, depreciation, and all charges to which trading concerns are liable, before you label them with the price for sale. Then, assuming that as ratepayers you are purchasing your own commodities, there is no need to make a paper profit out of yourselves, and have the doubtful gratification of paying income-tax upon it."

Tarapaca Water-Works Company, Limited.—The annual general meeting of this Company was held on the 2nd inst.—Sir Robert Harvey in the chair. In moving the adoption of the report, he said that although he was not able, as last year, to announce an increase in the net profit, the amount earned (£45,896), irrespective of the sum allocated and the reserve for doubtful debts, could not but be considered as satisfactory. The quantity of water required by the Railway Company—which they were obliged, under their fixed contract, to supply up to 60 million gallons per annum—had gradually increased during the last few years; and the Company's mains had been taxed to the utmost to satisfy the demand. During the whole of 1905, in order to meet their obligations to the Railway Company, they were obliged to purchase large quantities of water from sources far away from their mains, necessitating carriage by train; and it was the cost of this water which had had the effect of reducing the net profit, though the receipts had shown a considerable advance. Dealing with the accounts, Sir Robert said the Directors recommended the payment of a final dividend of 4 per cent.—making 7½ per cent. for the year—and the placing of £10,000 to the reserve fund, which would then amount to £35,000 after the transference of £80,000 from the fund in reduction of capital expenditure account. There remained to be carried forward £7369. The report was adopted.

Teignmouth Water Supply.—It was reported at a meeting of the Teignmouth District Council on Thursday that the Local Government Board had given their sanction to the proposed loan of £21,830, for works in connection with the proposed new supply of water from the works which the Paignton District Council are carrying out on Dartmoor. The Chairman (Mr. W. M. Bird), in congratulating the Council upon the prospect of an early completion of the work, said their action was founded upon a resolution passed in the year 1882. The Surveyor (Mr. G. F. Gettings) said the Local Government Board stipulated that the Mannesmann tubes which it was proposed to use as part of the pipe-line should not be tapped. It would be an easy matter to make provision for possible connections by putting in T-pieces and valves, so that they might get a revenue from the villages on the route without the necessity for tapping the main. By using Mannesmann tubes, his estimate was that the cost of the works would be reduced from £21,830 to £19,300. The Local Government Board had, however, sanctioned the borrowing of the money for only 21 years, instead of 30 years, for which they asked, being apparently doubtful as to the length of life of the tubes. This would increase the annual cost to the Council by £14; but it would be better to accept this than to run the risk of a further delay through asking for a longer period. It would take them at least 18 months to carry out the work. It was decided that the Surveyor should prepare specifications and quantities with a view to the work being carried out as quickly as possible.

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NEW DESIGNS.

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COTTAGE LANE, CITY ROAD, LONDON.
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Tiverton Gas Undertaking.—The Tiverton Town Council report, with reference to their gas undertaking, that they have never had a year equal to that just closed. They earned £600 more than their standing charges; yet this was not done by postponing any necessary expense on the upkeep of the works. On the contrary, more money was laid out on them. The tender of Messrs. Willey and Co., of Exeter, for four new purifiers and a washer-scrubber, recently advertised in the "JOURNAL," has been accepted. Application is to be made to the Local Government Board for permission to borrow £2000 for the purpose of carrying out the work, which it is hoped to complete during the summer.

Municipal Trading Departments in Birmingham.—The accounts and balance-sheet of the Birmingham Gas Department for the year ended March 31 last show a net surplus of £54,546, which is to be handed over in aid of the improvement rate. In addition, the interest on the reserve fund (£4000) is devoted to the same object, and about £15,000 is contributed in the shape of public and court lighting. The Gas Committee are spending some £3000 on plant for the prevention of naphthalene. The net surplus of the Electricity Department is £6097, which is to be carried to the reserve fund. The water undertaking shows a deficiency of £80,419, of which £45,000 will be covered by a contribution from the borough fund, and the remainder by a transfer from capital account.

A ratepayers' memorial has been presented to the Marple Urban District Council, strongly complaining about the "Mond gas nuisance" which exists in the place. The Council referred the matter to the Nuisance Committee.

The Laindon and District Gaslight, Coke, and Water Company has been registered with a capital of £12,000, in £5 shares (1200 preference), to adopt an agreement with the Water-Works, Lighting, and Power Investment Corporation, Limited, and to carry on the business of a gas and water company.

The Directors of the Continental Union Gas Company, Limited, have resolved to pay an interim dividend on the ordinary stock of 3 per cent., free of tax, for last half year (being at the rate of 6 per cent. per annum), together with the half-yearly dividend of 3½ per cent. on the preference stock; the latter being less income-tax.

An exhibition of gas appliances was held in the Town Hall, Crediton, last week, under the auspices of the Gas Company. It was opened by Mr. W. A. Schultz, the Chairman of the Company; and prominent features were the stands of the Welsbach Incandescent Gaslight Company, Limited, and the Richmond Gas Stove and Meter Company, Limited.

Messrs. J. & W. B. Smith, of Farringdon Road, intimate that, in consequence of the continued advance in copper, &c., they are compelled to advise customers of a further advance of 5 per cent., making 10 per cent. advance in all on the net prices of goods made wholly or partially of metal, shown in their catalogue of October, 1905, with the certain exceptions. There is no advance on glassware, &c.

A proposal to levy a rate-in-aid of 2d. in the pound on the citizens of Bradford in respect of the water undertaking has been overwhelmingly defeated in the Town Council; and the Water Committee have been instructed to find some other means of raising the money required. This no doubt will result in increasing the charges for water, much of which is at present disposed of to manufacturers on very advantageous terms. The heavy sinking fund charges in connection with the Nidd Valley scheme are responsible for the deficiency.

The revenue account of the Omagh Gas-Works for the fifteen months ending March 31 shows a profit of £1770. A Local Government Board inquiry has been held into an application of the Urban District Council for a loan of £2000, to be spent on the extension of the plant and the provision of working capital. The improvements are to include plant for the manufacture of sulphate of ammonia and the substitution of oxide of iron for lime as a purifying medium, as recommended by their Consulting Engineer, Mr. Joseph Hepworth.

The Birmingham and District Master Gas-Fitters Association have instituted a series of smoking concerts for the purpose of bringing its members and those of other organizations of a similar character into closer contact, with the view of fighting municipal trading. At the first concert, which took place last week, the Chairman (Mr. Charles Breeden) mentioned that it was the object of the members to form Associations throughout the country, with Birmingham as the centre. They meant to maintain the workmen's wages on a proper level, and to discourage shoddy work.

The report of the Directors of Meters Limited for the year ended March 31 states that the trading has resulted in a gross profit of £35,006, which is reduced by general management expenses, Directors' fees, legal charges, expenses on patents, income-tax, and depreciation of buildings, machinery, and plant. A sum of £3660 has been spent out of revenue on repairs and renewals. After providing for interest on debenture stock, the net profit amounts to £23,273, which, with the sum brought forward, makes £26,340. After allowing for dividends on the preference shares and paying an interim dividend on the ordinary shares, the Directors recommend the payment of a dividend at the rate of 7 per cent. per annum upon the ordinary shares (making 6 per cent. for the year), and the addition of £7000 to the reserve fund—making it £52,000.

We have received from the Pulsometer Engineering Company, Limited, of Reading and London, a catalogue they have just issued of their "Karoome" simple and compound boiler-feed pumps. It has been prepared with the view of illustrating the standard and stock sizes of these pumps, and showing work actually accomplished, so as to enable engineers to judge for themselves of the designs and workmanship. Some of the features of these pumps are that they have no flywheels or gearing, that the water-ways are large, while the valves are of small diameter and lift, and that they are made on the interchangeable system. The simple pumps are for pressures up to 200 lbs., and the compound ones up to 300 lbs., per square inch. At the end of the catalogue will be found a few remarks on spare gear and testing, which may be of interest to engineers.

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PROMPT DELIVERY.

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GASOMETER WORKS. C/o Haasenstein and Vogler, Lucerne.

Plant (Second-Hand) for Sale.

BARGES. No. 4591.
ENGINES, BLOWERS, SHAFTING, &c. Mill Hill Gas Works.

Plant (New or Second Hand) Wanted.

AMMONIA STILL CHAMBERS. No. 4596.
GASHOLDER AND TANK. No. 4600.

Tar Distilling Works and Plant for Sale.

EDWARD RUSHTON, SON, AND KENYON, Manchester.

Company Meetings.

BROMLEY GAS CONSUMERS' COMPANY. Bromley, May 22. Six o'clock.

Stocks and Shares.

HARTLEPOOL GAS AND WATER COMPANY. May 24.
LUTON WATER COMPANY. May 30.
SOUTHEND WATER COMPANY. May 26.
SUTTON GAS COMPANY. May 22.
WANDSWORTH AND PUTNEY GAS COMPANY. May 29.

TENDERS FOR

Coal and Cannel.

BARNSTAPLE GAS COMPANY. Tenders by May 26.
BUXTON GAS DEPARTMENT. Tenders by May 28.
CANTERBURY GAS AND WATER COMPANY. Tenders by June 2.
CLITHEROE GAS DEPARTMENT. Tenders by May 22.
DARWEN GAS DEPARTMENT. Tenders by May 30.
DROITWICH GAS DEPARTMENT. Tenders by May 31.
EAST DEREHAM GAS DEPARTMENT. Tenders by June 5.
EVESHAM GAS DEPARTMENT. Tenders by May 31.
FARNHAM GAS COMPANY. Tenders by May 26.
GAINSBOROUGH GAS DEPARTMENT. Tenders by May 26.
GLOUCESTER GASLIGHT COMPANY. Tenders by June 2.
HALIFAX GAS DEPARTMENT. Tenders by May 23.
HAWORTH GAS DEPARTMENT. Tenders by May 30.
HOLBEACH GAS AND COKE COMPANY. Tenders by May 24.
LEEK GAS DEPARTMENT. Tenders by May 28.
LOUTH GAS COMPANY. Tenders by May 21.
MANSFIELD GAS DEPARTMENT. Tenders by May 21.
OLDHAM GAS DEPARTMENT. Tenders by May 22.
SEDGLEY GAS DEPARTMENT. Tenders by June 6.
SHEPPEY GAS COMPANY. Tenders by May 23.
SKIPTON GAS DEPARTMENT. Tenders by May 31.
SWADLINCOTE GAS DEPARTMENT. Tenders by May 30.
TYLDESLEY-WITH-SHAKERLEY GAS DEPARTMENT. Tenders by May 29.
UXBRIDGE AND HILLINGDON GAS CONSUMERS COMPANY. Tenders by June 1.

Exhauster and Steam Engine.

NELSON GAS DEPARTMENT. Tenders by May 25.

Fire Clay Goods.

BUXTON GAS DEPARTMENT. Tenders by May 28.

Lead and Lead Pipe.

TYLDESLEY GAS AND WATER DEPARTMENT. Tenders by May 29.

Lime.

SWADLINCOTE GAS DEPARTMENT. Tenders by May 30.
TYLDESLEY-WITH-SHAKERLEY GAS DEPARTMENT Tenders by May 29.

Meters.

TYLDESLEY GAS DEPARTMENT. Tenders by May 29.

Pipes, &c.

TYLDESLEY-WITH-SHAKERLEY GAS AND WATER DEPARTMENT. Tenders by May 29.

Tar and Liquor.

BUXTON GAS DEPARTMENT. Tenders by May 28.
LEEK GAS DEPARTMENT. Tenders by May 28.
MANSFIELD GAS DEPARTMENT. Tenders by May 21.
SKIPTON GAS DEPARTMENT. Tenders by May 31.
TYLDESLEY-WITH-SHAKERLEY GAS DEPARTMENT. Tenders by May 29.
TONBRIDGE GAS DEPARTMENT. Tenders by May 25.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith

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Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.

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All Communications, Remittances, &c., to be addressed to WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.
Telegrams: "GASKING, LONDON." Telephone: P.O. 1571a Central.

OXIDE OF IRON.

O'NEILL'S OXIDE
For GAS PURIFICATION.
LARGEST SALE OF ANY OXIDE.

SPENT OXIDE PURCHASED IN ANY DISTRICT.

GAS PURIFICATION & CHEMICAL CO., LD.
PALMERSTON HOUSE,
OLD BROAD STREET, LONDON, E.C.

WINKELMANN'S

"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for GAS-WORKS.
ANDREW STEPHENSON, 182, Palmerston House, Old Broad Street, London, E.C. "Volcanism London."

AMMONIACAL Liquor wanted.
BROTHERTON AND CO., LTD., Ammonia Distillers. Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, AND WAKEFIELD.

"VITERNUS" METALLIC PAINT FOR GAS-WORKS PLANT.
JOHN E. WILLIAMS AND CO.,
LOWER MOSS LANE,
MANCHESTER, S.W.
Telegrams: "ENAMEL." National Telephone 1759.

JOHN RILEY & SONS, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of Special SULPHURIC ACID, for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol, which has now been used for upwards of 50 Years. References given to Gas Companies.

GAZINE—A radical Solvent and Preventative of Naphthalene deposits, which has been used for many years on the Continent for the cleaning of Mains and Services, and is now being adopted in England. It is also used for the Enrichment of Gas, and has an Illuminating Value of double that of 90 per cent. Benzol.
Supplied by C. BOURNE, 120, Manor House Road, NEWCASTLE-ON-TYNE.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 54 & 47, Westminster Bridge Road, LONDON, S.E.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS, AND GOVERNORS.
REPAIRS RECEIVE PROMPT ATTENTION.
Telephones: 254 Oldham, and 2412 HOP, London.
Telegrams:—
"BRADDOCK, OLDHAM," and "METRIQUE, LONDON."

BROTHERTON & CO., LIMITED.
Offices: Commercial Buildings, LEEDS.
Correspondence invited.

GAS OILS.

MEADE-KING, ROBINSON, & CO.
Represent the Strongest Independent Refineries in America; also Petroleum Spirit for Gas Enrichment. 8, EXCHANGE STREET, MANCHESTER, and 11, OLD HALL STREET, LIVERPOOL.

TEMPERLEY TRANSPORTERS

FOR Rapid and Economical Handling of Coal and Coke in Gas-Works.
Next Illustrated Advertisement will appear on May 29.
TEMPERLEY TRANSPORTER COMPANY,
72, BISHOPSGATE STREET WITHIN, LONDON, E.C.
Telephone: 365 LONDON WALL. Telegrams: "TRANSUMO."

GASHOLDER PAINTING.

PAINTING Work for all kinds of Gas-Works Plant, Roofs, Bridges, &c., undertaken by Contract or otherwise.
FREDERICK BOYALL, 31, Regent's Row, DALSTON, N.E.

SULPHATE OF AMMONIA
SATURATORS and all LEAD and TIMBER WORK in Connection with Sulphate Plants.
We guarantee promptness, with efficiency for Repairs.
JOSEPH TAYLOR AND CO., CENTRAL PLUMBING WORKS, BOLTON.
Telegrams: SATURATORS, BOLTON. Telephone 0848.

GLASS SHADES of every description,
for all kinds of Interior GAS LIGHTING.
Illustrated sheets on application.
JOHN WALSH WALSH,
SOHO AND VESTA GLASS WORKS, BIRMINGHAM.
Telegrams: "VESTA, BIRMINGHAM."
National Telephone: No. 63.
London Show-Room: 4, HOLBORN CIRCUS, E.C.

OXIDE OF IRON.
(NATURAL.)

BALE & CHURCH will be pleased to send Quotations and Samples on application.
SPENT OXIDE PURCHASED.
BALE'S FIRE CEMENT for all Retort and Furnace work.
PAINT for Gasholders, Purifiers, &c.
5, CROOKED LANE, LONDON, E.C.

SULPHURIC ACID.

SPECIALLY prepared for the Manufacture of SULPHATE OF AMMONIA.
SPENCER, CHAPMAN, & MESSEL, LTD.
(with which is amalgamated WM. PEARCE & SONS, LTD.),
36, Mark Lane, LONDON, E.C. Works: SILVERTOWN.
Telegrams: "HYDROCHLORIC, LONDON."
Telephone 341, AVENUE.

TAR AND LIQUOR WANTED.
Best Prices paid.
DENT AND CO.,
Ouse Chemical Works, SELBY.

SULPHURIC ACID for Sale, specially suitable for making Sulphate of Ammonia.
BROTHERTON AND CO., LTD., Chemical Manufacturers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

PATENTS AND TRADE MARKS
PUBLICATIONS, "MERCHANDISE MARKS ACT, and Decisions thereunder," 1s.; "TRADE SECRETS v. PATENTS," 6d.; "DOCTRINE of EQUIVALENTS, Mechanical and Chemical," 6d.; SUBJECT-MATTER of PATENTS," 6d.
MEWBURN, ELLIS, & PRYOR, Chartered Patent Agents, 70 and 72, Chancery Lane, London, W.C. Telegrams: "Patent London." Telephone: No. 243 Holborn.

HYDRATED OXIDE OF IRON.

PREPARED from Pure Iron.
Twice as Rich as Bog Ore.
Gives no Back Pressure.
The Cheapest in the Market.
Can be Exchanged for Spent Oxide.
READ HOLLIDAY AND SONS, LTD., HUDDERSFIELD.

ROBERT DEMPSTER & SONS, Ltd., Contractors for Complete CARBONIZING PLANTS and every description of GAS APPARATUS and ELEVATING and CONVEYING PLANT, ROSE MOUNT IRON-WORKS ELLAND.

GAS TAR wanted. BROTHERTON AND CO., LTD., Tar Distillers. Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, AND WAKEFIELD.

GAS-FITTER wants Situation. Good References.
Address T. E., 76A, Broughton Road, FULHAM, S.W.

EXPERIENCED Traveller seeks Engagement. First-Class connection with Gas Companies. Well known. Many Years on the Road.
Address No. 4602, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

RESPONSIBLE Plumber, German, early Thirties, for Five Years Foreman in Gasometer Works, seeks Situation in England in Gasometer Works or similar Trade. Testimonials at disposal.
Replies to A2356, care of Haasenstein and Vogler, Lucerne, SWITZERLAND.

SHOW-ROOM Manager seeks Appointment. Practical and thoroughly Experienced in every description of Gas Appliances. Accustomed to Control of Workmen, Estimating, Advising Consumers, &c. References.
Address ADVERTISER, 9, Montrose Villas, Putney, LONDON.

WANTED, a Competent Man to act as CLERK OF WORKS. Good Mechanical Knowledge desirable.
Address No. 4599, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, Experienced Main and SERVICE LAYER; also a GAS-FITTER, well accustomed to Slot Installations and Cookers.
Apply, with *copies* of Testimonials, to CHAS. DAKIN, Gas-Works, Cradley Heath, STAFFS.

FIRST-CLASS Man wanted for Leakage Testing and Tracing. Permanency for a suitable man, capable of supervizing Main and Service Laying, Inside Fitting, and Interviewing Customers.
Apply, by letter, with full Particulars, to No. 4601, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, an Assistant-Superintendent for Gas Plant in Canada, Carbonizing 100,000 tons of coal annually.
Applicants must give full details of past Experience, Qualifications, and Accomplishments, also Age, References, and Salary expected, to Box 2396, Montreal, CANADA.

REQUIRED, at a Gas-Works in the Provinces, Two Thoroughly Trained MECHANICAL ENGINEERS—one to SUPERVISE the MACHINERY and PLANT, and the Fitters and Labourers employed in connection with same, the other as YARD FOREMAN. Previous Experience of the kind, in both cases, essential.
Apply, in own handwriting, stating Age, Qualifications, References, Wages required, &c., to No. 4595, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

EAST GRINSTEAD GAS AND WATER COMPANY.

WANTED, a thoroughly experienced CLERK capable of keeping the various Accounts of the Company.
Applications, endorsed "Application for Clerkship," accompanied by *copies* of at least Three Testimonials (which will not be returned), and stating Age, Qualifications, and Salary required, to be sent to the undersigned on or before the 5th of June next.
Selected Candidates will be written to.
EVELYN ALSTON HEAD, Secretary.
East Grinstead, May 11, 1906.

WANTED, Four Chambers for Ammonia Still, 4 ft. 11 in. diameter over all, 8 in. deep. Second-Hand preferred.
Address No. 4596, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

THE London and Provincial Gas-Works Corporation, Parliament Chambers, Westminster, are prepared to PURCHASE outright for Cash a GAS-WORKS where, by the introduction of additional Capital, there would be scope for further extension and development.
Address, with full Particulars, as above.

FOR SALE, Cheap, Two complete 5½-inch Cylinder Marshall's High-Speed ENGINES, with Bed Plates; Two No. 5 BLOWERS on moveable bed and Safety Boxes; Two Sets of moveable SHAFTING—the lot complete with Pulleys, spare Belts, and Parts. Reason for selling, replacement by larger Plant.
Can be viewed at the GAS-WORKS, MILL HILL, N.W.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

WANTED, Copper Scrap, 72s.; Brass, 48s.; Zinc, 16s.; Lead Ashes, 8s. Also old Wet Gas-Meters bought.
ROSSE WORKS, Leeds Road, BRADFORD.

WANTED, a Gasholder, in Steel or Cast-Iron Tank, of about 30,000 cubic feet capacity.
Offers and Particulars, to No. 4600, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

BARGES for Sale—Owing to the illness of the Proprietor, a Fleet of Steel and Wooden Barges suitable for Gas Companies, Contractors, &c., to be disposed of. All in first-class condition.
Apply, by letter, to No. 4591, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

LEEK URBAN DISTRICT COUNCIL.

TO TAR DISTILLERS AND OTHERS.

TENDERS are invited for the purchase of the surplus GAS TAR and AMMONIACAL LIQUOR produced at the Leek Gas-Works for One Year, commencing the 1st of July, 1906, at per Ton of 2240 lbs. at the Works.
Forms of Tender and further Particulars may be obtained from the Manager of the Gas-Works or the undersigned.
Sealed and endorsed Tenders, addressed to the Chairman of the Gas Committee, to be delivered at the Town Hall, Leek, not later than Four o'clock on Monday, the 28th of May, 1906.
The highest or any Tender will not necessarily be accepted.
By order,
HAROLD HENSHAW, Clerk to the Council.
Town Hall, Leek, May 11, 1906.

LEEK URBAN DISTRICT COUNCIL.

TO COLLIERY PROPRIETORS AND OTHERS.

TENDERS are invited for the supply of all or part of 10,000 Tons of GAS NUTS or BEANS, delivered at the Leek Station (on the North Staffordshire Railway), during the Year commencing the 1st of July, 1906.
Forms of Tender and further Particulars may be obtained from the Manager of the Gas-Works or the undersigned.
Sealed and endorsed Tenders, addressed to the Chairman of the Gas Committee, to be delivered at the Town Hall, Leek, not later than Four o'clock on Monday, the 28th of May, 1906.
The lowest or any Tender will not necessarily be accepted.
By order,
HAROLD HENSHAW, Clerk to the Council.
Town Hall, Leek, May 11, 1906.

UXBRIDGE AND HILLINGDON GAS CONSUMERS' COMPANY.

TENDERS FOR COAL.

THE Directors of the above Company invite TENDERS for the supply of about 7000 Tons of GAS COAL per annum, for One, Two, or Three Years, deliveries of which are to commence in July, 1906, and finish the last week in June, 1907, or each subsequent Year.
Tenders to be made out for the above quantity of the best description of Screened or Unscreened Gas Coal, either in whole or part, from or divided between the Durham, Yorkshire, or Derbyshire Pits, delivered by barge free alongside the Company's Works on the Grand Junction Canal, or by Rail to Uxbridge Station (Great Western Railway).
Tenders are to state the names of the pits from which the above description of Coal will be supplied. Deliveries to be according to the instructions of, and to the entire satisfaction of, the Company's Engineer.
Tenders to be received on or before June 1, 1906, addressed to the Chairman, Gas Offices, Uxbridge, Middlesex, and endorsed "Tender for Coal."
No Form of Tender sent.
W. M. GARDINER, Secretary.
Uxbridge, Middlesex, May 10, 1906.

BUXTON URBAN DISTRICT COUNCIL.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for:

GAS COAL AND CANNEL.

The supply of 6000 Tons of Best Screened GAS COAL and 3000 Tons of CANNEL, to be delivered as required at the Gas-Works Siding, Midland Railway, Buxton, during the Twelve Months ending July 31, 1907, in accordance with the Specification and Conditions, which may be obtained from the Gas Engineer, Mr. H. Barker, Town Hall, Buxton.

TAR AND AMMONIACAL LIQUOR.

The Purchase of the surplus TAR and the whole of the AMMONIACAL LIQUOR which is produced, and delivered into Purchasers' Tank-Waggons at the above-mentioned Siding, during the Twelve Months ending June 30, 1907.

RETORTS, FIRE-CLAY GOODS, &c.

The supply of RETORTS and the necessary FIRE-CLAY GOODS required during the Twelve Months ending June 30, 1907.
Forms of Tender may be obtained from the Gas Engineer.
Sealed Tenders, endorsed "Coal" and "Cannel," "Tar," "Liquor," and "Fire-Clay Goods" respectively, are to be delivered to the undersigned on or before Monday, the 28th inst.
The Committee do not bind themselves to accept any Tender.
(Signed) JOSIAH TAYLOR, Clerk.
Town Hall, Buxton, May 5, 1906.

CANTERBURY GAS AND WATER COMPANY.

TENDERS FOR GAS COAL.

TENDERS are invited for the supply of 14,500 Tons of the best GAS COAL, to be delivered during One Year, commencing on the 1st of July next.
Forms of Tender, containing Particulars and Conditions of the Contract, may be obtained on application to the undersigned.
Sealed Tenders, endorsed "Coals," to be delivered at the Company's Offices, Castle Street, Canterbury, on or before Saturday, the 2nd prox.
By order,
JAMES BURCH, Secretary and General Manager.
May 7, 1906.

LOUTH GASLIGHT COMPANY.

TENDERS FOR GAS COAL.

THE Directors of the Louth Gaslight Company invite TENDERS for the supply of 4000 Tons (more or less) of GAS COAL, required at their Works during a period of One Year.
Forms of Tender, with Specification, may be obtained on application to the Secretary.
Sealed Tenders, endorsed "Tenders for Coal," addressed to the Chairman of the Directors, Louth Gas Company, Louth, to be sent to the Secretary on or before the 21st of May next.
The Directors do not bind themselves to accept the lowest or any Tender.
Tenders from Agents will not be considered.
PHILIP ALLISON, Secretary.
May 7, 1906.

SKIPTON URBAN DISTRICT COUNCIL.

TENDERS FOR GAS COAL.

THE Council invite Tenders for the supply of about 7000 Tons of best GAS COAL, Screened, Unscreened, and Nuts, to be delivered free at the Railway Station, Skipton, or at the Council's Wharf adjoining the Gas-Works in Skipton on the Leeds and Liverpool Canal, between June 30, 1906, and July 1, 1907, in monthly quantities.
Full Particulars as to periods and quantities of deliveries, &c., and Form of Tender may be obtained from the Manager, Mr. J. H. Woodward, Gas-Works, Skipton, and Tenders, endorsed "Tender for Gas Coal," are to be sent to the Chairman of the Gas Committee, Gas-Works, Skipton, on or before Thursday, May 31, 1906.
The lowest or any Tender not necessarily accepted.
RICHARD WILSON, Clerk to the Council.

SKIPTON URBAN DISTRICT COUNCIL.
(GAS DEPARTMENT.)

TAR.

THE Council invite Tenders for the purchase and removal of Surplus TAR produced at the Skipton Gas-Works between the 30th of June, 1906, and the 1st of July, 1907.
Probable quantity, 400 Tons.
Further Particulars may be obtained from Mr. J. H. Woodward, Gas-Works, Skipton, to whom Tenders, endorsed "Tar," are to be sent before Thursday, the 31st of May, 1906.
RICHARD WILSON, Clerk to the Council.

GAINSBOROUGH URBAN DISTRICT COUNCIL.
(GAS DEPARTMENT.)

TENDERS FOR GAS COAL.

THE Gas Committee of the above Council invite TENDERS for the supply of 6000 Tons of best GAS COAL (Screened, Unscreened, and Nuts), to be delivered at the G.C. Railway Station, Gainsborough, between the 1st of July, 1906, and the 30th of June, 1907, in such quantities, monthly, as may be required.
Sealed Tenders, endorsed "Tender for Gas Coal," giving full Particulars of the Coal offered, to be addressed to the Chairman of the Gas Committee, must be delivered at the Gas-Works, Gainsborough, not later than the 26th inst.
No Special Form of Tender issued.
The Committee do not bind themselves to accept the lowest or any Tender.
JOHN BALDWIN, Manager.
Gas-Works, Gainsborough, May 10, 1906.

SWADLINCOTE DISTRICT URBAN DISTRICT COUNCIL.
(GAS DEPARTMENT.)

THE Gas Committee of the above Council are prepared to receive TENDERS for—

LIME.

The supply of about 150 Tons of Best Hand-Picked Buxton LIME, to be delivered at the Gas-Works in such quantities and at such times as may be required during the Twelve Months ending June 30, 1907.

GAS COAL.

The supply of 4000 Tons (more or less) of Best Screened GAS COAL, to be delivered in such quantities as may be required during the Twelve Months ending June 30, 1907.
All Particulars and Form of Tenders may be obtained from Mr. G. B. Smedley, the Engineer and Manager.
Tenders must be on the Council's Forms and Envelope, and accompanied by Analysis, and must be delivered to the undersigned on or before Twelve noon, May 30, 1906, endorsed "Lime," "Gas Coal," as the case may be.
The Council do not bind themselves to accept any Tender.
W. A. MUSSON, Clerk to the Council.
Gas-Works, Swadlincote, May 11, 1906.

TONBRIDGE GAS COMPANY.

THE Directors of the above Company invite TENDERS for the removal of the surplus TAR produced at their Works during the Year ending June 30, 1907.

Approximate quantity, 65,000 Gallons.

Further Information may be had on application to the undersigned.

Tenders to be delivered on or before the 25th inst.

JAMES DONALDSON,
Engineer and Secretary.

FARNHAM GAS COMPANY, LIMITED.

THE Directors of the above Company invite TENDERS for the supply of 5000 Tons of good, clean, fresh-worked Yorkshire and Durham GAS COAL (Screened and Unscreened) delivered at Farnham Station (L. & S.W. Rly.) in such quantities and at such times as required during the Year ending May 31, 1907.

Forms of Tender may be obtained on application.

Tenders, endorsed "Coal," to be delivered to the undersigned not later than the 26th of May next.

S. J. SYMONDS,
Manager and Secretary.

Gas-Works, Farnham,
May 7, 1906.

BARNSTAPLE GAS COMPANY.

TENDERS FOR COAL.

THE Directors invite Tenders for the supply of about 4000 Tons of best screened GAS COAL, to be delivered at Fremington Quay or Barnstaple Station, as required, during the Year ending the 30th of June, 1907.

Tenders to be sent to the undersigned not later than Saturday, the 26th inst.

The lowest or any Tender not necessarily accepted.

No Special Form of Tender.

F. L. SCHOFIELD,
Secretary and Manager.

15, Cross Street, Barnstaple,
May 8, 1906.

BOROUGH OF DARWEN.

TENDERS FOR SCREENED GAS COAL AND NUTS.

THE Gas Committee of the above Corporation are prepared to receive TENDERS for the supply of 10,000 Tons of Screened GAS COAL and NUTS, to be delivered at the Gas-Works Siding, Darwen, in Corporation waggons.

Forms of Tender and all Information as to Quantities may be obtained on application to Mr. A. H. Smith, Gas Engineer, Darwen.

Sealed Tenders, endorsed "Gas Coal and Nuts," must be delivered to the undersigned not later than Wednesday, the 30th day of May, 1906.

No Tender necessarily accepted.

By order,
WM. P. HALLIWELL,
Town Clerk.

Town Clerk's Office,
Darwen, May 8, 1906.

TYLDESLEY-WITH-SHAKERLEY URBAN DISTRICT COUNCIL.

THIS Council invite Tenders for the supply, at the Gas-Works, Tyldesley, from the 1st of July next to the 30th of June, 1907, of the undermentioned:—

Screened GAS COAL or NUTS.
CAST-IRON SPIGOT and SOCKET PIPES (Gas and Water).
LEAD TUBING, Tinned (Gas and Water).
PIG LEAD.
BEST BUXTON LIME.
GAS-METERS (Ordinary and Automatic).

TENDERS are also invited for the purchase of the surplus TAR and AMMONIACAL LIQUOR to be produced at the Gas-Works during the Year ending the 30th of June, 1907.

Further Particulars and Forms of Tender may be obtained on application to Mr. R. H. Ginman, Engineer, Gas-Works, Tyldesley.

Sealed Tenders, on authorized Forms only, endorsed "Tender for ———," to be delivered at my Office not later than noon on the 29th of May inst.

The Council do not bind themselves to accept the lowest or any Tender.

By order,
W. J. MATTHEWS,
Clerk to the Council.

Council Offices, Tyldesley,
May 8, 1906.

MANSFIELD CORPORATION.
(GAS DEPARTMENT.)

TENDERS FOR GAS COAL AND CANNEL.
TENDERS FOR TAR AND AMMONIACAL LIQUOR.

COAL.

THE Gas Committee are prepared to receive TENDERS for 1500 Tons of CANNEL and 11,000 Tons of Best Screened GAS COAL, delivered at Mansfield Station for One Year from the 1st of June, 1906, to the 31st of May, 1907.

TAR AND LIQUOR.

TENDERS for surplus TAR and LIQUOR made from the 1st of June, 1906, to the 31st of May, 1907. Tenders for Liquor to be made either at a fixed price per Ton or on the Sliding-Scale regulated by the price of Sulphate.

Tenders, endorsed "Coals" or "Tar and Liquor," as the case may be, to be sent to J. Harrop White, Esq., Town Clerk, Mansfield, on or before the 21st of May, 1906.

Particulars and all other Information from the undersigned.

NOTE: No Special Form of Tender provided.

The Committee do not bind themselves to accept the lowest or any Tender.

ARTHUR GRAHAM,
Engineer and Manager.

Gas-Works, Mansfield,
May 4, 1906.

TO COAL CONTRACTORS AND OTHERS.

THE Sedgley Urban District Council invite TENDERS for supplying 700 to 1200 Tons of GAS COAL; the deliveries to be made at the Shut End Siding at such times and in such quantities as may be directed.

It is desirable that a statement of an Analysis of the quality of a Sample of the Coal to be supplied be sent with the Tender.

Sealed Tenders, marked "Coal," must reach me on or before the 6th of June, 1906.

The Council do not bind themselves to accept the lowest or any Tender.

By order,
JOSEPH SMITH,
Clerk to the Council.

Offices: High Holborn,
Sedgley, May 14, 1906.

COUNTY BOROUGH OF HALIFAX.

THE Gas-Works Committee of the Halifax Corporation invite TENDERS for the supply of GAS COAL, to be supplied in such quantities as may from time to time be determined by the Gas-Works Committee, during the Year ending June 30, 1907.

Forms of Tender and further Information may be obtained on application to Mr. J. Wilkinson, F.C.S., Engineer, Gas-Works, Halifax.

Tenders, endorsed "Coal," must be sent to the undersigned not later than Twelve o'clock noon on Wednesday, the 23rd of May, 1906.

The Committee do not bind themselves to accept the lowest or any Tender.

By order,
KEIGHLEY WALTON,
Town Clerk.

BOROUGH OF NELSON.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the supply and erection, at their Nelson Works, of One ROTARY GAS-EXHAUSTER, capable of passing 80,000 cubic feet per hour, with Horizontal Steam Engine combined.

Specification, Form of Tender, and full Particulars, may be obtained on application to Mr. A. J. Hope, Engineer.

Tenders, endorsed "Exhauster," to be delivered to the undersigned not later than Ten a m. on Friday, the 25th of May.

The Committee do not bind themselves to accept the lowest or any Tender.

J. H. BALDWICK,
Town Clerk.

Town Hall, Nelson,
May 11, 1906.

BOROUGH OF EVESHAM.
(GAS DEPARTMENT.)

TENDERS FOR GAS COAL.

THE Evesham Corporation invite TENDERS for the supply of from 1000 to 2000 Tons (or less if required) of best Screened GAS COAL, during the Year ending the 30th day of June, 1907, to be delivered on rail at Evesham.

Tenders, to be marked "Tender for Gas Coal," to be sent to me not later than the 31st day of May inst., and to include full description as to Coal and Price.

No Form of Tender supplied.

The Corporation do not bind themselves to accept the lowest or any Tender.

THOS. A. COX,
Town Clerk.

Town Clerk's Offices,
Evesham, May 2, 1906.

HOLBEACH GAS AND COKE COMPANY, LIMITED.

THE Directors of the above Company are prepared to receive TENDERS for the supply of 600 Tons of large Screened GAS COAL and large NUTS (Railway weight), to be delivered at the Holbeach Railway Station at such times and in such quantities as the Company shall require.

Terms of payment, 80 per cent. on each delivery and the balance on completion of the Contract.

Tenders, marked "Tenders for Gas Coal," stating names of Coal and Analysis, to be sent to me not later than Two p.m. on Thursday, the 24th inst.

No Form of Tender supplied.

The Directors do not bind themselves to accept the lowest or any Tender.

By order,
THOS. C. WILLDERS,
Secretary.

Holbeach, May 11, 1906.

GLOUCESTER GASLIGHT COMPANY.

TENDERS FOR GAS COAL.

THE Directors of the above Company invite TENDERS for the supply of about 33,000 Tons of GAS COAL for One Year from the 1st day of July next, in such Monthly quantities as may be required by the Company.

Tenders to state the Price delivered at the Midland Railway Sidings, Hempsted, near Gloucester, or the Great Western Railway Wharf, Llanthony, Gloucester; or if sent (as preferred) by Water, the price f.o.b., and also the price delivered at the Gas Company's Wharf, on the Gloucester and Berkeley Canal.

Further Particulars, and Forms of Tender may be obtained of the undersigned.

Sealed Tenders, endorsed "Tender for Coal," specifying the Description and Quality of the Coal, to be addressed to the Chairman, Gas Offices, Eastgate Street, Gloucester, and delivered not later than Saturday, the 2nd day of June next.

The Directors reserve to themselves the right to accept the whole or any portion of any quantity offered, and do not bind themselves to accept the lowest or any Tender.

By order,
WILLIAM E. VINSON,
Secretary.

Gas Offices, Gloucester,
May 7, 1906.

COUNTY BOROUGH OF OLDHAM.

THE Oldham Corporation Gas-Works Committee are prepared to receive TENDERS for the supply of about 110,000 Tons of COAL, required by them during the Year ending the 30th of June, 1907.

Specifications and Forms of Tender can be obtained on application to Mr. Arthur Andrew, Gas and Water Offices, Oldham, to whom Tenders are to be sent, on or before Tuesday, the 22nd of May, 1906.

J. H. HALLSWORTH,
Town Clerk.

Oldham, May 8, 1906.

THE East Dereham Urban District Council are prepared to receive TENDERS for the supply of about 1600 Tons of Screened GAS COAL for the ensuing Year.

Conditions and Forms of Tender to be had of the undersigned.

Tenders, marked "Coals," to be sent in by Ten a.m. on the 5th day of June, to

B. H. VORES,
Clerk to the Urban District Council.

East Dereham,
May 7, 1906.

THE Haworth Urban District Council are prepared to receive TENDERS for the supply of 2500 Tons of GAS COAL (Screened, Unscreened, and Gas Nuts) delivered at the Haworth Station during the ensuing Twelve Months.

Sealed Tenders, endorsed "Gas Coal Tender," to be forwarded to me the undersigned not later than the 30th inst.

No Special Form of Tender.

WILLIAM ROBERTSHAW,
Clerk to the Council.

1, Burlington Chambers,
North Street, Keighley.

BOROUGH OF CLITHEROE.
(GAS DEPARTMENT.)

TENDER FOR GAS COAL.

THE Gas Committee invite Tenders for Screened GAS COAL, NUTS, SLACK, and CANNEL, to be delivered at the Gas-Works Siding, during the Year ending June 30, 1907.

Particulars and Forms of Tender may be obtained from the undersigned.

Sealed Tenders, endorsed "Tender for Gas Coal," addressed to the Chairman of the Gas Committee, to be delivered at my office on or before Tuesday, the 22nd of May, 1906.

ROBT. BARRETT,
Manager.

Gas-Works, Clitheroe,
May 2, 1906.

CORPORATION OF DROITWICH.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the supply of 1600 to 1800 Tons of best screened GAS COAL or NUTS during the ensuing Twelve Months ending the 30th of June, 1907, to be delivered at Droitwich (Great Western Railway).

Specification and Form of Tender may be obtained from the undersigned.

The Committee reserve the right to accept Tenders for the whole or any portion of the quantity offered, and do not bind themselves to accept the lowest or any Tender.

Sealed Tenders, endorsed "Tenders for Gas Coal," to be sent to S. John Tombs, Esq., Town Clerk, Droitwich, not later than the 31st of May, 1906.

SAML. G. ASKEW,
Manager.

Gas Office, Droitwich,
May 12, 1906.

SHEPPEY GAS COMPANY.

TENDERS are invited for the supply of about 10,000 Tons of Ravensworth Pelaw GAS COAL, unscreened, or any similar class of Gas Coal, for the Year commencing July 1 next.

Deliveries to be free alongside the Company's Wharf, at West Minster in the Medway.

Quantities as certified by the Company's Meter over their Weighing Machine.

Cash Monthly.

Tenders to be accompanied by a working Analysis of the Coal offered, and received not later than the 23rd of May.

The Directors do not bind themselves to accept the lowest or any Tender.

No Special Form of Tender required or supplied.

H. BARBER,
Secretary and Manager.

Gas Offices,
2, Trinity Road, Sheerness.

FREEHOLD TAR DISTILLING WORKS, ASHTON NEW ROAD, CLAYTON, in the CITY OF MANCHESTER.

FOR SALE, IN ONE LOT, WITH OR WITHOUT PLANT AND MACHINERY.

TO be Sold by Auction by Edward RUSHTON, SON, & KENYON, at the Thatched House Hotel, on Tuesday, the 22nd day of May, 1906, at 3 for 3.30 o'clock, subject to the General Conditions of Sale of the Manchester Incorporated Law Association, and to the Special Conditions to be then produced, and which may be inspected at the Offices of the undermentioned Solicitors one week prior to Sale.

The TAR DISTILLING WORKS AND PREMISES, situate in Ashton New Road, Clayton, and known as the "Dalton Chemical Works," with the LAND forming the Site thereof, DWELLING HOUSE, and the Fixed and Loose PLANT and MACHINERY therein, except the Mines and Minerals under the said land.

N.B.—In the event of the Works not being sold as above, the property will then be OFFERED WITHOUT THE PLANT AND MACHINERY.

Further Information and Cards to View may be obtained from the AUCTIONEERS, 13, Norfolk Street, or from MESSRS. CHAPMAN, ROBERTS, AND BECK, Solicitors, 32, Fountain Street, both of MANCHESTER.

ISSUES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his ISSUES by AUCTION under PARLIAMENTARY POWERS of STOCKS and SHARES in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.

Terms for Issuing such Capital, and also for including Gas and Water Stocks and Shares belonging to Private Owners in these Periodical Sales, can be obtained on application at MR. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the

SUTTON GAS COMPANY.

NEW ISSUE OF £7000 ORDINARY STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, May 22, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the

WANDSWORTH AND PUTNEY GASLIGHT AND COKE COMPANY.

NEW ISSUE OF £10,000 THREE PER CENT. PERPETUAL DEBENTURE STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, May 29, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the

SOUTHEND WATER-WORKS COMPANY.

NEW ISSUE OF 1200 NEW ORDINARY FIVE PER CENT. MAXIMUM £10 SHARES.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, May 29, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

LUTON WATER COMPANY.

INCORPORATED BY ACT OF PARLIAMENT, 1865.

SALE BY TENDER OF £3200 (OR THEREABOUTS) NEW CONSOLIDATED ORDINARY STOCK.

MINIMUM PRICE, £112 10s. PER CENT.

NOTICE is Hereby Given, that the Directors of this Company will SELL by TENDER £3200 (or thereabouts) NEW CONSOLIDATED ORDINARY STOCK, bearing a Maximum Dividend of Four per cent. per annum, being the remainder authorized to be issued under the Provisions of the Luton Water Act, 1897.

Particulars and Forms of Tender may be obtained on application to the Secretary of the Company; and Tenders must be sent in to the Office of the Company not later than Four o'clock p.m. on Wednesday, the 30th day of May, 1906.

The Stock will be allotted to the highest bidders; but no Tender will be accepted at a lower price than at the rate of £112 10s. for each £100 Stock.

The Stock will be entitled to Dividend from the 1st day of July, 1906, and be Registered in the Name of the Purchaser free of charge.

By order of the Board of Directors,
J. G. MEADOWS,
Secretary.

The Water Company's Office,
Crescent Road, Luton,
April 26, 1906.

HARTLEPOOL GAS AND WATER COMPANY.

IMPORTANT SALE OF GAS AND WATER STOCK.

TO BE SOLD by Auction, at the Company's Offices, Middleton Road, West Hartlepool, on Thursday, the 24th of May, 1906, at 2.30 p.m. precisely,

MR. J. W. CROSBY, AUCTIONEER,

£10,000 (Nominal) of the NEW ORDINARY STOCK (Maximum Dividend, Five per cent.) authorized to be created and issued under the Powers contained in the Company's Act, 1898.

The above Stock will be entitled to Dividend from the 21st of June next, if then fully-paid up, and will be Registered in the name of the Purchaser without charge.

A Deposit of 10 per cent. will be required to be paid at the time of Sale, and the remainder on or before the said 21st day of June.

The Stock will be offered in Lots of £100 each.

By order of the Directors,
W. SCOTT,
Secretary.

Hartlepool Gas and Water Company's Offices,
West Hartlepool, April 12, 1906,

BROMLEY GAS CONSUMERS' COMPANY.

NOTICE is Hereby Given, that an ExTRAORDINARY GENERAL MEETING of the Bromley Gas Consumers' Company will be held, at Six p.m. precisely, on Tuesday, the 22nd day of May, 1906, at the "Bell" Hotel, Bromley, for the purpose of rescinding the Resolution, passed at the General Meeting of the Company, held on the 20th day of February last, creating £10,000 of "B" Ordinary Stock of the Company, and of cancelling such Stock; and to resolve upon the creation of £10,000 of "A" Ordinary Stock of the Company, and to authorize the Directors to issue the same at such times, upon such terms, and in such manner, as they may think fit, subject to the Statutory Conditions of Sale and issue relating to such Stock.

By order of the Directors,
HENRY WILLIAM AMOS,
Secretary.

156, High Street, Bromley,
Kent, May 1, 1906.

NOW READY, THE SECOND EDITION OF

GAS COMPANIES'

BOOK-KEEPING.

A Practical Treatise on the Keeping of Gas Companies' Accounts.

BY

JOHN HENRY BREARLEY, and
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for determining the calorific value of gases

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Sperm Value 878·85 lbs. per Ton.

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Highest Results in Gas, & Excellent Coke.

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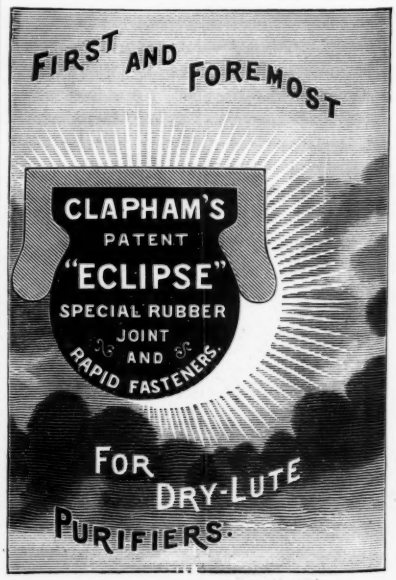

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PIPES and CONNECTIONS, 1¼ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS, and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.
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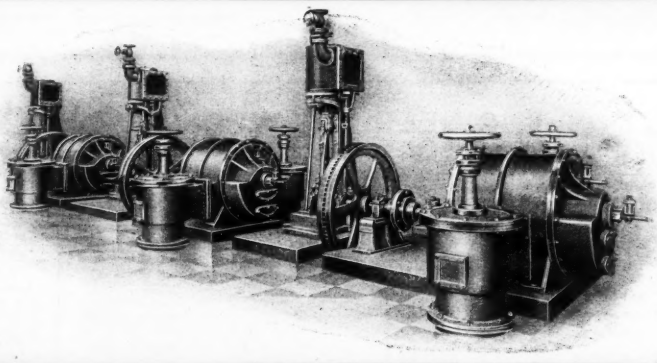

THREE SETS OF VERTICAL STEAM ENGINE & EXHAUSTER TOTAL CAPACITY 210000 CUB. FT. OF GAS PER HOUR AT 60 REVS PER MINUTE SUPPLIED & ERECTED AT PORTSEA GAS WORKS.

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SOCKET-PIPES FOR GAS OR WATER PURPOSES.
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AGENTS FOR
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PATENT
"FLUXITE"
FIRE
CEMENT
For
STOPPING CRACKS
IN GAS RETORTS.
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Patent Automatic Machinery
FOR
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Full Particulars may be obtained from the Sole Makers,
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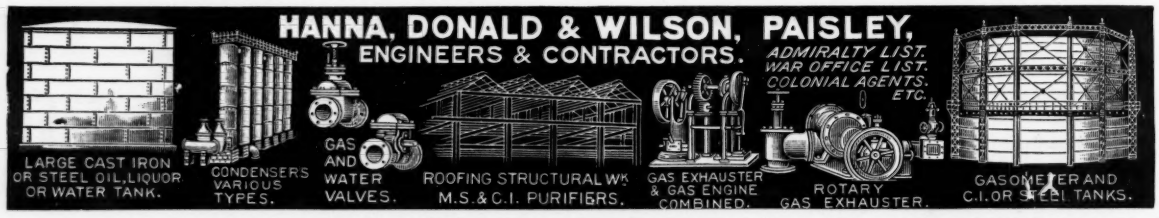
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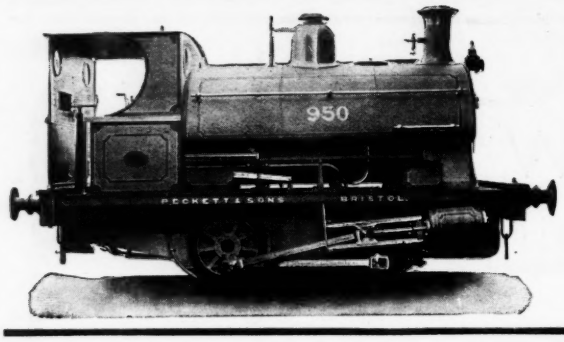

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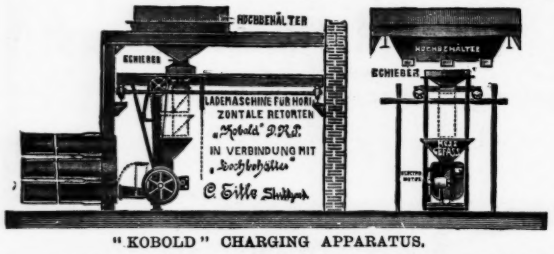

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1.—The simplest of all existing Charging Machines, as in charging there is only ONE shaft working.
2.—Almost indestructible in construction, as there are no combustible parts exposed to the heat of the Retorts.
3.—Uniform bed of coal of any desired height in the retort, and consequently any desired weight of charge may be inserted.
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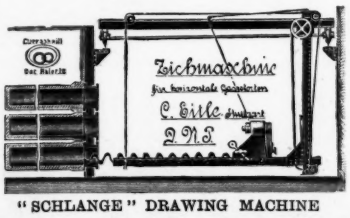
5.—Least inrush of cold air owing to the close fit of the charging mouthpiece with the retort mouthpiece, with consequently practically no cooling of the retort, the least outrush of flame and smoke, and therefore smallest loss of gas.
6.—Smallest consumption of power.
7.—Most rapid working, as the complete charging of a retort requires only two pulls of a lever.
8.—May be set at any position in regard to height by either manual or motor power.
9.—Lowest cost to purchase; paying interest and redemption in about three years.



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4.—Smallest consumption of power.
5.—Lowest cost to purchase.
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PATENTS IN ALL COUNTRIES.
BLUE WATER GAS, CARBURETTED WATER GAS.

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SPENCER'S PATENT HURDLE GRID

The very best Patent Grid on the Market for Holding Oxide Lightly,

And Holding Oxide Lightly is the Secret of Success for Better Purification.

No Extra Cost in adopting this system to existing Purifiers.

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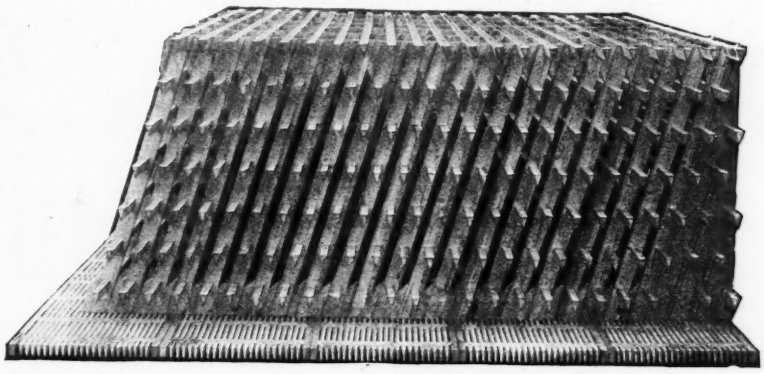

Can make the Change from the Old to the New System without any Stoppage.

Simple in Construction and very easy to fix in Position.

The ADVANTAGES with SPENCER'S PATENT HURDLE GRID have been proved during this Winter at several Places, where full Sets have been used:

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3—Also reduce Back-Pressure 75 per cent.

References as to above can be had on Application.

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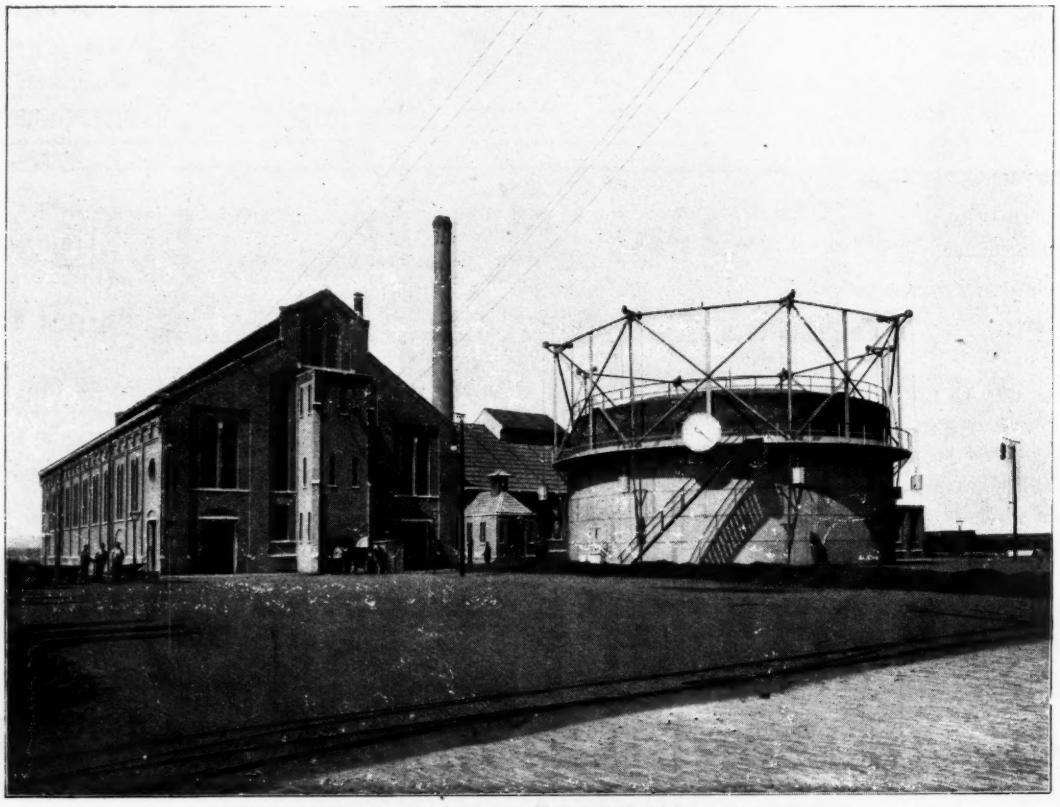

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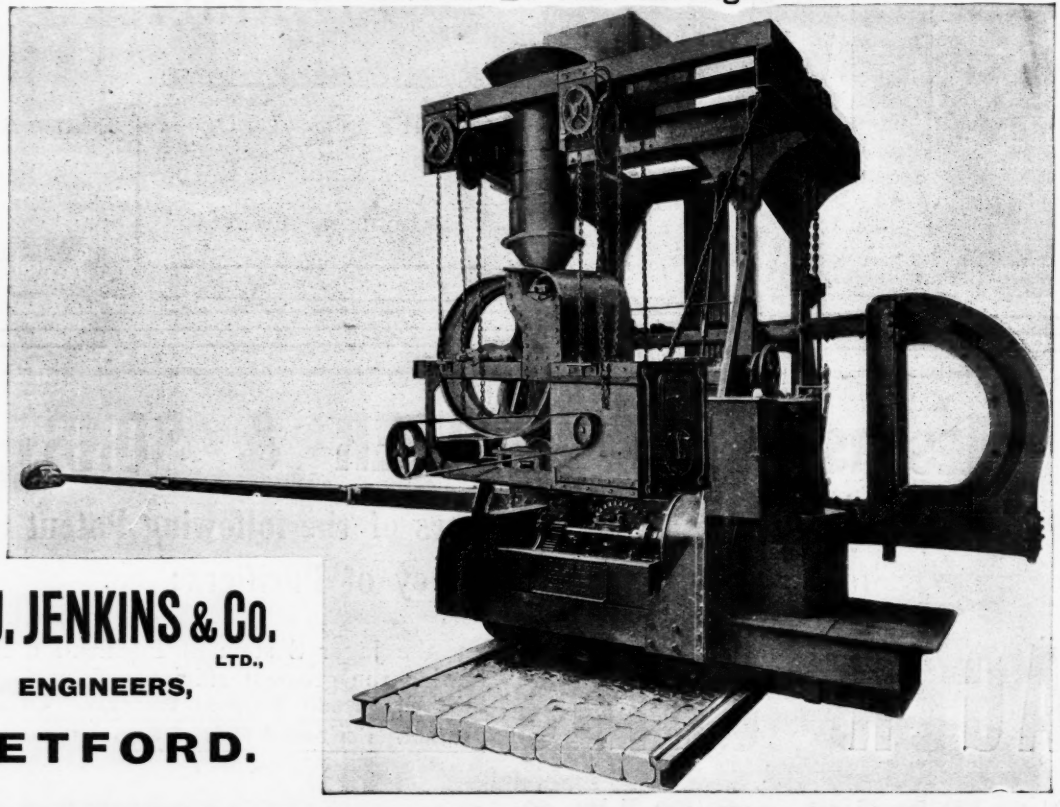

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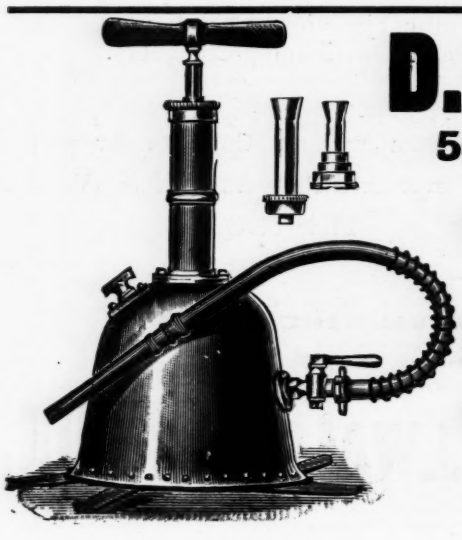

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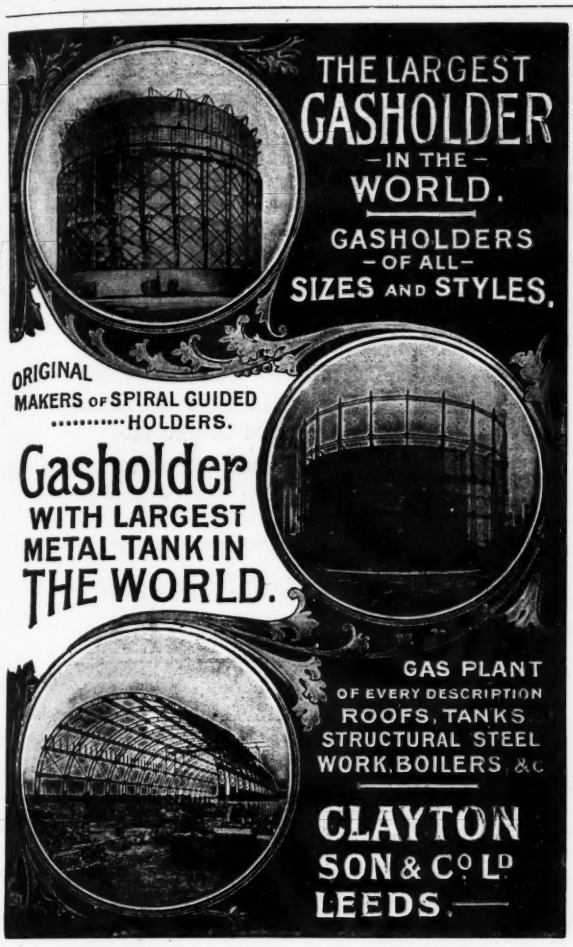

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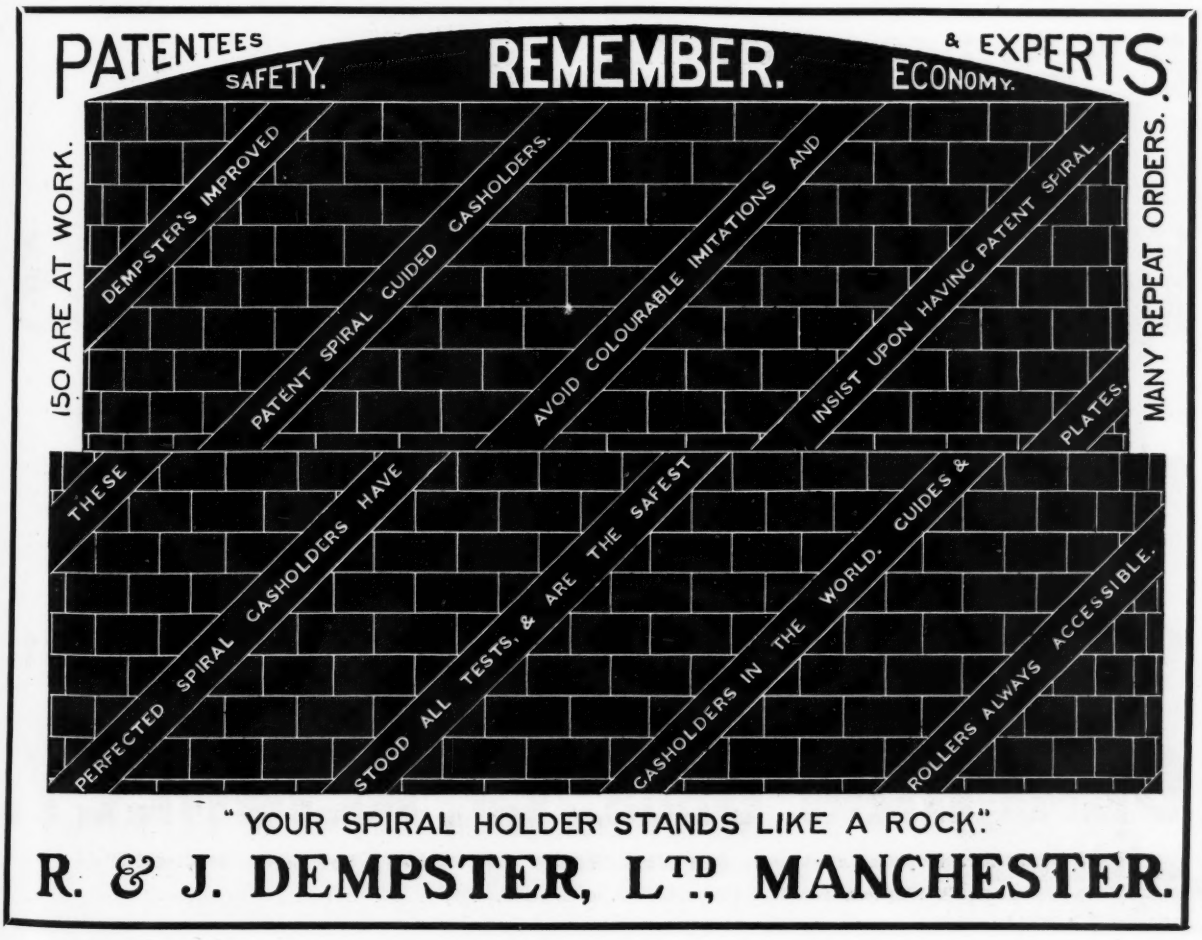

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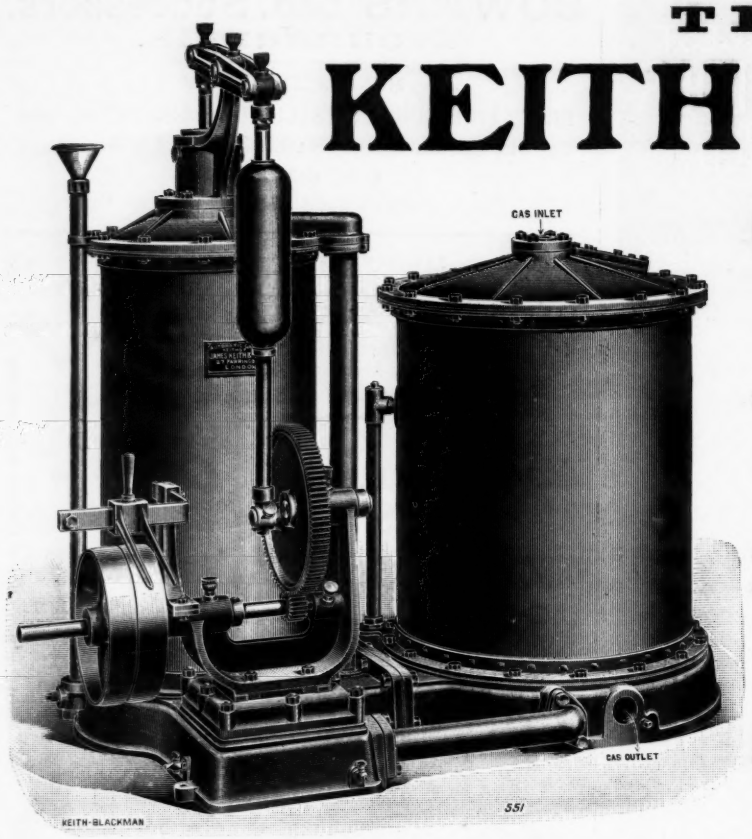

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